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Oil Review Africa

Oil · Gas · Petrochemicals

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CSR: Making a difference in Africa

West Africa: The economic outlook for oil and gas

Process safety for operational excellence

Big data, recruitment, well control, airborne surveys, enhanced oil recovery and dealmaking in 2017

Gbenga Onadeko, Programme Committee Co-Chair, AETC (p50)

PROTECTING OIL AND GAS PIPELINE ASSETS AND MEASURING VALUES!

Solewant Multi-Layer pipe coating plant was commissioned on **Friday, November 25, 2016,** in our pipe coating plant, storage and pipe preservation centre, at Alode-Eleme, Rivers State, by His Excellency, The executive Governor of Rivers State, The Executive Secretary of NCDMB, NNPC, IOCs, NOCs, PETAN, EPCs and other Captains of Oil and Gas industries.

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...protecting Oil and Gas line pipe Assets & Measuring Values!

On page 16, we have a special report on corporate social responsibility for oil and gas.

EDITOR'S NOTE

CORPORATE SOCIAL RESPONSIBILITY (CSR) has become more than just a catchphrase for oil and gas operators. While it is easy to talk the talk when it comes to the public relations value of CSR activities, it is also important to walk the walk. We look at the many ways operators along the value chain can make a positive difference to the communities in which they operate, ensure their activities are environmentally sustainable. Turn to page 16 for our CSR cover story.

Mental health is another area where oil and gas industry employers can make a real difference, especially for staff who work in offshore and remote locations, which often means being away from home for long periods of time. For more on this important – and often neglected – subject, turn to page 35.

Elsewhere in this issue, we have expert commentary on what Ghana's new president could mean for the country's oil and gas industry (page 28) and plenty of news from across Africa.

Georgia Lewis
Managing Editor

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INTERVIEW

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21-23 **International Petroleum Week**
London
www.ipweek.co.uk

21-23 **West African International Petroleum Exhibition & Conference**
Lagos
www.waipec.com

27-2 Mar **Nigeria Oil & Gas**
Abuja
www.cwcnog.com

27-2 Mar **Nigeria Power**
Abuja
www.nigeria-power.com

MARCH

29-31 **Upstream West Africa Summit**
Lagos
www.upstreamwestafrica.com

APRIL

11-13 **East Africa Oil & Gas Exhibition & Conference 2017**
Nairobi
www.expogr.com/kenyaoil

19-21 **MOC Mediterranean Offshore Conference & Exhibition**
Alexandria
www.moc-egypt.com

25-26 **Big Data Analytics for Oil & Gas**
Abu Dhabi
www.oilandgasdata.com

26-27 **StocExpo Middle East Africa**
Dubai
www.easyfairs.com

MAY

1-4 **Offshore Technology Conference**
Houston
http://2017.otcnet.org

24-25 **Africa Independents Forum**
London
www.africa-independentsforum.com

JUNE

22-23 **Ghana Summit**
Accra
www.cwcghana.com

JULY

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

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

Tank storage sector to meet for StockExpo Middle East Africa

OIL COMPANIES, TANK terminal operators, traders, financiers and regulators focused on Africa and the Middle East regions will converge on Dubai from 26-27 April for the StocExpo event to discuss the trends, challenges and opportunities facing the sector.

Despite tough times in the oil sector with ongoing low oil prices impacting on business decisions, the tank storage sector in Africa and the Middle East is developing at a rapid rate.

This confidence in the market is largely down to big-scale investment in both regions, with the UAE alone set to double its tank storage capacity in the next few years.

StocExpo is supported by the UAE Ministry of Energy as well as many oil majors, ports, terminals and institutions, including ENOC, Fujairah Oil Terminal, GPS Chemoil, Gulf Refining Company, Gulf Petrochem, Horizon, Siddco, Socar Aurora and Star Energy OilTanking.

The conference sessions will include presentations on growth and expansion opportunities, oil price trends, and improving safety, efficiency and resilience.

Patrick Kulsen, managing director of PJK International, will be addressing the conference on the supply and demand outlook for tank terminals in Africa and the Middle East.

Tushar Tarun Bansal, director of Ivy Global Energy, will talk about whether Africa can provide the demand for a successful Mideast storage hub.

For attendees interested in investing in the Middle East, speakers will share perspectives on growth and expansion in the region, as well as financing options available for infrastructure in the Middle East.

As well as a strong two-day conference programme, there will be more than 100 international and regional suppliers showcasing new equipment and the latest technologies. Exhibitors include CTS Middle East, Protego, Emco Wheaton, Loadtec Engineered Systems, Mascoat and Kanon Loading Equipment.

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Equatorial Guinea offers to join OPEC and agrees to cut production


Image Credit: Ministry of Mines, Industry & Energy, Equatorial Guinea

His Excellency Gabriel Mbaga Obiang, Minister of Mines and Hydrocarbons

EQUATORIAL GUINEA'S MINISTRY of mines and hydrocarbons has submitted its interest to join the Organisation of Petroleum Exporting Countries (OPEC).

Gabriel Mbaga Obiang, the country's mines and hydrocarbons minister, travelled to Vienna in January 2017 to meet OPEC officials and present the country's offer to become the 14th member nation.

The offer follows on from an announcement in December 2016 that Equatorial Guinea will join 10 other non-OPEC countries to reduce 558,000 barrels per day of total oil production in 2017.

Equatorial Guinea's share of the planned production cut is 12,000 barrels per day.

"For decades, Equatorial Guinea has achieved a sterling track record as a dependable supplier of petroleum to consumers in all corners of the world," said the minister. "We firmly believe that Equatorial Guinea's interests are fully aligned with those of OPEC in serving the best interests of the industry, Africa and the global economy."

"There is a consensus amongst producers that an oversupply of oil has been dragging down the price of the barrel," he added. "Equatorial Guinea is doing its part to ensure stability in the market and that the industry continues to invest in exploring and developing our resources."

Seaborne oil trade expected to grow in the coming years despite low oil prices

OIL TANKER BUSINESS is set to grow in the coming years, with the sector overcoming a slump which lasted from 2009 until 2014. Since then, the sector has recovered with average annual growth over recent decades of 2.2 per cent surging to 6.5 per cent since early 2015. Factors which have contributed to the trade growth include OPEC's decision to allow the market to balance on its own without price support, as well as the listing of sanctions in Iran, an estimated worldwide increase in oil refining of 7.7 mn barrels per day until 2021, and swinging supply and demand dynamics.

"While some tanker operators remain cautious about the future, many are riding high on the back of storage deals with big refineries – especially offshore Singapore and Malaysia – whereby tankers are used to balance supply and demand by removing tonnage from the market," said Chris Hayman, chairman of Seatrade.


Image Credit: kees torn/Flickr

Across the world, seaborne tanker trade is experiencing a revival.

Positive preliminary results for Cairn Energy

IN ADVANCE OF Cairn Energy releasing its results for the year to 31 December 2016 on 8 March 2017, the chief executive, Simon Thomson, has released a pre-close update, with a positive outlook for its six-well operation in Senegal.

"With six successful wells drilled to date in Senegal, Cairn has established a significant and growing resource base," he said. "The 2017 drilling programme aims to further define the SNE field for development and target additional exploration upside on the acreage."

The announcement reported that the third phase of drilling will commence at the end of January 2017 with further evaluation of the SNE discovery.

SNE-5 and SNE-6 wells will be drilled in the south of the SNE structure with the aim of gathering important connectivity and deliverability data from upper reservoirs by conducting well tests, including interference testing.

Data gathered will enable calibration of the reservoir model for upper reservoirs. This is critical for optimising recovery factors by ensuring potential development wells are designed appropriately.

The joint venture, in which Cairn has a 40 per cent stake, is finalising the selection of futher optional exploration and appraisal wells to follow the two firm wells and ensure efficient evaluation of the full licence area.

Stena DrillMAX, a sixth-generation drillship, has been contracted for two firm wells in the exploration and appraisal campaign with multiple follow-on options.

São Tomé and Príncipe eyes oil and gas growth in 2017

WHILE AGRICULTURE, IN particular cocoa, coconuts, coffee, pepper and flowers, remain the top exports for São Tomé and Príncipe, companies are optimisitc about hydrocarbons prospects in the sea off the archipelago.

Kosmos Energy added to its offshore portfolio by investing in four blocks in the Gulf of Guinea between 2015 and 2016.

Additionally, Oando, via its 81.5 per cent-held subsidiary, Equator Exploration, signed a PSC with the National Petroleum Agency of São Tomé and Príncipe in 2016. This PSC is for Block 12 in the Exclusive Economic Zone, taking an 87.5 per cent participating interest. with the national agency holding the remaining 12.5 per cent share as a carried interest.

Image Credit: Helena Van Eykeren/Flickr

Offshore is promising for São Tomé and Príncipe.

Africa Oil announces discovery in Kenya

AFRICA OIL HAS announced that the Erut-1 well in Block t, Northern Kenya, has discovered a gross oil interval of 55 metres with 25 metres of net oil pay at a depth of 700 metres. The overall oil column for this field is between 100 and 125 metres.

The well was drilled with the objective of testing a structural trap at the northern limit of the South Lokichar basin. Erut-1 was drilled 10km north of the Etom-2 well and they share important characteristics.

Fluid samples and wireline logging indicate the presence of oil, with the work on Erut-i successfully proving that oil has migrated to the northern limit of the South Lokichar basin.

The PR Marriott Rig-46 drilled the Erut-1 well to a final depth of 1,317 metres and it is slated to move to the southern part of Block 10BB, where it will spud the Amosing-6 appraisal well.

Africa Oil CEO Keith Hill said, "We are very pleased with this result which further confirms the potential of the northern portion of the Lokichar Basin unlocked by the Etom-2 discovery. We are very keen to expand our current drilling program to test additional prospects in the area which have now been de-risked by this discovery."

DNV GL research: Oil and gas companies expect to restructure for long-term sustainable growth

NEW RESEARCH BY DNV GL, technical advisor to the oil and gas industry, shows oil and gas companies seeking to rebalance business portfolios and reorganising for a new era.

Short-term agility, long-term resilience, DNV GL's seventh annual benchmark study on the outlook for the oil and gas industry, surveys senior oil and gas professionals worldwide.

In a period of drawn-out recovery, 49 per cent of senior oil and gas professionals surveyed expect their businesses to diversify into, or invest more in, opportunities outside of oil and gas.

Still, almost eight out of 10 see long term opportunities for gas. Twenty-six per cent of industry leaders expect their business to invest in renewable energy in 2017, with a majority seeing investments in renewables as a shift in long-term business strategy.

"The number of companies we now see pursuing opportunities beyond oil and gas signals a step change in the reshaping of the sector and demonstrates its ability to adapt and build a more robust, diverse and sustainable energy future," says Elisabeth Tørstad, CEO, DNV GL – Oil & Gas.

Image Credit: DNV GL

Restructuring could aid growth, report finds.

Oil and gas professionals expect investments to continue across the value chain in 2017, though at a lower level than last year, as the percentage of respondents expecting to maintain or increase CAPEX has dropped from 43 per cent to 39 per cent.

A third of respondents say their organisations will be increasing M&A activity in the next 12 months, while more than three-quarters of respondents expect increased industry consolidation.

Meanwhile, 85 per cent see cost management as a top or high priority for 2017, and a majority see their current cost-efficiency measures as marking a permanent shift towards a leaner way of working. Organisational restructuring, reducing operating expenditure and improving efficiency from existing assets are the top three priorities for cost control.

Two-thirds say that the cost pressures are driving more industry collaboration, and 66 per cent of respondents say their organisation will seek greater standardisation of tools and processes, which is up from 59 per cent last year.

Digitalisation is also increasingly seen as a means to enhance operational and cost efficiencies.

Nigeria seizes OPL245 in US$1.2bn Shell/Eni fraud operation

Image Credit: Royal Dutch Shell group

NIGERIA IS SEIZING one of the richest oil blocs on the continent and is to prosecute oil giants Shell and Eni in a corruption scandal worth around US$1.2bn. The scandal has drawn in investigators from all around the world including the USA and a number of European states according to the Nigerian Federal High Court document.

The bloc was estimated to contain 9bn barrels of crude and since 1998, there have been disputes over its control. For the next 12 years the oil block would change hands between Malabu, oil giant Shell and the Nigerian government as all parties jostled for control. That disagreement started in 2001 when the Nigerian government first cancelled the award of the block to Malabu and awarded it to Shell, investigations showed. The government would later revoke the allocation from Shell."

In 2011, Shell and Agip (now Eni) bought the bloc for US$1.2bn, but investigators discovered the payment to ex-petroleum minister Dan Etete was "fraught with fraud" and the state oil company only received US$210m from the deal. Criminal charges have been filed against both companies and several executives in an Italian court. Charges of fraud and money laundering in December 2016 have been filed against Etete, former attorney general Mohammed Bello Adoke and businessman Aliyu Abubakar.

Multotec lays the foundations for local capacity development across Africa

MULTOTEC, THE INDUSTRY-LEADING mineral processing solutions provider, has grown its business in Africa for over almost two decades, and counts its success down to developing local capacity – including skills and infrastructure – as close to the customer as possible, to allow quick and effective response. "We prioritise skills transfer and capacity-building in our African facilities, and also train our customers' staff in the maintenance of our equipment," says Multotec CEO Thomas Holtz. "It is becoming increasingly important – both to us as suppliers and to our customers, the mines – to invest in local skill development as a key sustainability practice."

Multotec has provided training in South Africa for many years now, and is continuing to promote a more formal and structured manner of training in six regions. "The culture of a fly-in-fly-out consultant is expensive and generally does not empower local professionals and operators," he says. "Where we can build local capacity to support our products, the customers appreciate that – and we've seen growing interest in this training over the past two to three years."

Multotec hosting a training class in Ghana

Image Credit: Multotec

Cairn Energy and Tullow Oil share price rises with African announcements

CAIRN ENERGY TOLD investors last week that it would start a third round of exploration drilling in Senegal which could contain as much as 27mn barrels of oil.

The company has already delivered six successful wells in the West African nation. The market reacted positively to the announcement with Cairns Energy's share price quickly rising by three per cent to 248.4p.

As well as the promising Senegalese operations, Cairn's Catcher and Kraken developments in the North Sea are on track for first oil in 2017. Kraken's development, in which Cairn has a 29.5 per cent working interest, progressed well in 2016 and ended the year ahead of budget and on schedule. First oil for Kraken is predicted by Q2 of 2017.

Tullow Oil has also had positive market reaction after releasing news of its new oil discovery north of the South Lokichar basin in Kenya. See page 10 for more news about Tullow's Erut-1 well in Northern Kenya.

The share price of Tullow Oil increased by 1.5 per cent before settling at 313p.

Angus McCoss, exploration director at Tullow, said, "The roughly 100ft column proved that oil had migrated into the area and further drilling would now go ahead."

With the drop of oil price came a severe cut back in spending by oil companies. With expectation of the oil price to rise from the current US$55 a barrell to between US$60 and US$65 a barrell comes increased spending, investment and market confidence.

Tullow Oil also announced multiple top level changes. See page 12 for news on the boardroom moves for the company.

Kohler Power acquires Clarke Energy

KOHLER POWER, PART of the Kohler Co, has acquired Clarke Energy, a UK-based multinational specialist in the engineering, construction, installation and maintenance of power plants.

Kohler Co announced that its power group, which provides engines and power generation systems, has acquired Clarke Energy, the UK-based specialist of engine-based power plants and authorised distributor of GE's reciprocating engines in 19 countries across the world.

In the African market, Clarke Energy operates in Algeria, Botswana, Cameroon, Lesotho, Morocco, Mozambique, Nigeria, South Africa, Swaziland, Tanzania and Tunisia.

"Clarke Energy's end-to-end capabilities are very highly regarded around the world and the company's products and services are an excellent fit within our existing power systems business," said David Kohler, president and CEO of Kohler Co. "We're excited about this acquisition because it adds the distribution of large gaseous generators – viewed as a clean power source – to our product portfolio. We believe Clarke Energy's prime and continuous gaseous solutions are an ideal complement to our existing diesel generator offering for standby applications."

Founded in 1989, Clarke Energy provides distributed power solutions. The firm employs more than 1,100 people and has established a vast network of service locations using localised professionals. Company founder Jim Clarke, as well as current CEO Jamie Clarke and all other company leaders, will maintain their roles post-acquisition.

Italy meets with Nigerian minister of state for petroleum resources on terrorism issues

ITALY'S MINISTER FOR foreign affairs and international cooperation, Angelino Alfano, met with Emmanuel Ibe Kachikwu, Nigeria's minister of state for petroleum resources in relation to combating terrorist activities.

In recent years, terrorist activities have blighted the Nigerian oil industry, in particular with multiple instances of pipeline vandalism proving costly and environmentally damaging.

Image Credit: European People's PArty/Flickr

Angelino Alfano has met with Emmanuel Ibe Kachikwu on terrorism.

The focus of the meeting was on overcoming terrorism under the rule of law and with full respect for human rights.

Mr Alfano cited the long history of cooperation between the two countries as an important part of working together on this issue. He said he appreciates "the potential of the Nigerian market and its entrepreneurship" and that he considers Nigeria to be "Italy's second-biggest commercial partner in sub-Saharan Africa".

"Our excellent economic and commercial relations, which include the traditional presence of Italian companies in the oil and gas sector, present further opportunities for growth in other sectors, particularly agro-food and agro-industry, which is why a branch office of the Italian Trade Agency will be opening in Lagos in 2017," Mr Alfano said.

Mozambique minister shares oil and gas experiences in visit to Scotland

LETICIA KLEMENS, MOZAMBIQUE'S minister for mineral resources and energy, visited the United Kingdom for four days, with her visit centred on Subsea Expo 2017, which took place in the Scottish oil hub of Aberdeen.

At the conference, Ms Klemens addressed delegates on the potential of Mozambique's energy sector, with a focus on the business environment, and the opportunities and challenges that lie ahead.

Image Credit: Shutterstock

An oil platform off the coast of Mozambique.

As well as attending the Aberdeen event, Ms Klemens met with several represenatives of the British government and the private sector in London.

Accompanied by Joanna Kuenssberg, British High Commissioner to Mozambique, Ms Klemens' visit was stimulated by British expertise in oil and gas and by existing opportunities for cooperation and exchange of best practice between the two countries. It is hoped that British experts and companies will be able to help Mozambique maximise its potential in the hydrocarbons sector and ensure that ongoing development benefits the east African country economically and socially.

Tullow Oil strikes oil in Kenyan Erut-1 Well

TULLOW OIL PLC has announced it has made an oil discovery in the Kenyan Erut-1 Well while drilling the Erut-1 well in Block 13T, Northern Kenya, opening multiple prospects in the area. The company stated that a gross oil interval of 55 metres with 25 metres of net oil pay at a depth of 700 metres at the well. The oil column for the field is considered to be 100 to 125 metres.

Development continues apace in the Lokichar region.

Image Credit: george garang/Flickr

The objective of the well was to test a structural trap at the northern limit of the South Lokichar basin. The Erut-1 well was drilled 10 km north of the Etom-2 well. The company commented that fluid samples taken and wireline logging all indicate the presence of recoverable oil.

"Erut-1 successfully shows that oil has migrated to the northern limit of the South Lokichar basin and has de-risked multiple prospects in this area which will now be considered in the Partnership's future exploration programme," said Tullow Oil, which operates Blocks 13T and 10BB with 50 per cent equity and is partnered by Africa Oil Corporation and Maersk Oil both with 25 per cent.

The PR Marriott Rig-46 drilled the Erut-1 well to a final depth of 1,317 m and will now move to the southern part of Block 10BB.

UKEF backs Ghana offshore gas project

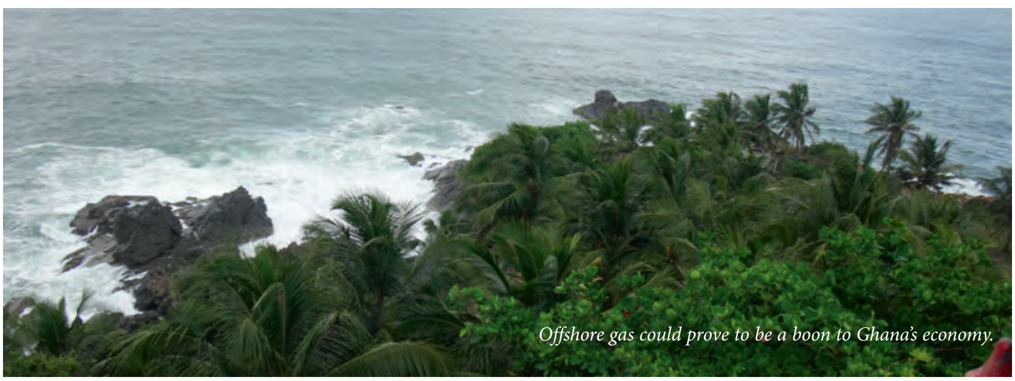
THE UK'S EXPORT credit agency UK Export Finance (UKEF) has announced that it will provide a loan of US$400mn for the development of offshore gas fields in Ghana, its first direct loan for a project in Africa. The UKEF support will finance the specialised systems and equipment, a significant proportion of which has been sourced from the UK.

The loan will be extended to GE Oil & Gas, a subsidiary of General Electric headquartered in the UK, to supply subsea production systems to the Offshore Cape Three Points (OCTP) project in Ghana. The deal builds on an agreement signed in 2015 between UKEF and GE Oil & Gas to provide up to US$12bn in financing.

The OCTP project will develop gas reserves that are expected to generate an additional 1,100MW of power for Ghana, which will alleviate the country's reliance on energy imports. This is expected to provide long-term energy security and support Ghanaian industrial development and help the country achieve its COP21 commitments for climate mitigation by displacing heavy fuel oil use with gas.

Minister for Trade and Investment Greg Hands said, "The Offshore Cape Three Points Project will greatly improve Ghana's energy security. Thanks to the UK Government's support, via UK Export Finance, and our global leadership in oil and gas, UK companies are ideally placed to support Ghana's future development and seize the huge export potential that brings."

Total investment in the development of the OCTP is estimated to be around US$7.9bn over the life of the project, which represents the largest foreign direct investment in the history of Ghana.



Offshore gas could prove to be a boon to Ghana's economy.

Image Credit: Tini Maier

ERHC Energy partners with Starcrest Energy Nigeria

ERHC ENERGY, A publicly traded American company with oil and gas assets in Sub-Saharan Africa, has announced the signing of an memorandum of understanding (MOU) with Starcrest Nigeria Energy.

Under terms of the MOU, the parties will explore joint participation in Nigerian oil and gas exploration and production opportunities. ERHC said in a statement that it expects to enter into additional agreements with Starcrest in due course.

The parties are currently in discussions over specific projects and investment opportunities in the parties' respective assets.

Starcrest, a member of the Chrome Group of companies, has interests in several Nigerian oil and gas exploration and production blocks including OPL 291 and OPL 242. Through its stake in Elcrest Exploration, it also has an indirect interest in OML 40.

ERHC's onshore exploration assets include a 35 per cent interest in Block 11A in Northwestern Kenya. This blocl is almost 12,000km².

The company also has a 100 per cent interest in Block BDS 2008 in Chad.

Meanwhile, ERHC's offshore interests include 100 per cent of the rights to Block 4 in the São Tomé and Príncipe Exclusive Economic Zone (EEZ) as well as interests across several oil blocks in the Nigeria-São Tomé and Príncipe Joint Development Zone (JDZ).

Oando completes gas and power partial divestment to Helios Investment Partners

OANDO, AN INDIGENOUS Nigerian energy group, has announced the completion of a partial divestment of 49 per cent of the voting rights in Oando's midstream business subsidiary, Oando Gas and Power (OGP), to Glover Gas & Power, a special purpose vehicle owned by Helios Investment Partners, an Africa-focused private investment firm.

"The commencement of this strategic partnership underlines Oando's status as the indigenous partner of choice for international firms in our industry, while also acknowledging the group's unwavering commitment to improving access to gas and power solutions for industries, consumers and commercial counterparties in the sub-region," said Jubril Adewale Tinubu, chief executive of Oando, upon completion of the transaction.

Oando Gas & Power continues to be an active employer of Nigerians.

Co-founder and managing partner of Helios, Tope Lawani added: "The completion of this transaction underscores Helios' commitment to investing in businesses that deliver energy access solutions to industries and consumers across the continent. We look forward to working closely with the OGP management team and other industry stakeholders to consolidate the company's position as a premier provider of cost-effective and reliable gas and power infrastructure."

Shell sells its 20 per cent Vivo Energy stake to Vitol Africa for US$250mn

SHELL HAS AGREED to sell its 20 per cent stake in Vivo Energy to Vitol Africa for US$25mn, with the transaction expected to be completed by the first half of 2017, subject to regulatory approval.

The sale is part of Shell's strategy to concentrate on its downstream operations, where it is more competitive. As part of the sale, a long-term brand licence agreement has been renewed to ensure that the Shell brand will remain visible across more than 16 countries in Africa.

The familiar Shell logo will still be visible across Africa after the deal with Vivo.

Vivo Energy was created by Vitol, Shell and Helios Investment partners in 2011 when Shell divested its majority share in its downstream operations in 14 African markets. Since then, there has been a significant expansion of the retail network from 1,300 to more than 1,700 stations. Vivo Energy plans US$300mn of investment over the next three years.

Chris Bake, Vivo chairman and a member of Vitol's executive committee said: "It has been a pleasure to partner with Shell in Vivo Energy. The Shell brand is well known and highly respected across Africa, and Vivo and its customers will continue to benefit from its use."

Tullow Oil announces board changes

TULLOW OIL HAS announced a number of changes to its board, including a new CEO.

Paul McDade, currently chief operating officer, will be appointed chief executive officer following Tullow's Annual General Meeting, which will be held on 26 April 2017. This follows an internal and external process led by the company's nominations committee.

We have a world class business with high quality assets and strong relationships across Africa that underpin our business," said Mr McDade upon the announcement of his appointment. "We have begun the vital process of deleveraging our balance sheet and our focus will now move to returning the business to growth as the recovery in the sector develops."

At the same time, after six years on Tullow's board and five as chairman, Simon Thompson will step down from the board. Aidan Heavey, CEO and founder of Tullow Oil, will succeed Mr Thompson as chairman of the group for a transition period of up to two years.

Ann Grant, senior independent director, will retire at the AGM after nine years' service on the board. Jeremy Wilson, meanwhile, a non-executive director of Tullow and chairman of the remuneration committee, will succeed Ms Grant as senior independent director.

Of the new-look board, Mr Thompson commented: "After careful consideration of the options, we are confident that this succession plan provides Tullow with the right combination of stability, continuity and fresh-thinking."

NOG 2017 TO EXPLORE DEVELOPMENTS IN THE OIL AND GAS SECTOR

The 16th edition of the Nigeria Oil and Gas Conference and Exhibition, (NOG) will take place from 27 February to 2 March 2017 at the ICC in Abuja, Nigeria, serving as a platform for exhibitors in the oil and gas sector to showcase their latest products and services.

ONE OF AFRICA'S biggest energy exhibitions and part of Nigeria Energy Week, the show will open its doors to oil and gas industry professionals, investors, governments and financiers to work together to formulate strategies for the future and create and strengthen business partnerships. According to event organisers, NOG 2017 expects to see participation from more than 200 companies and attract more than 6,500 visitors.

Exhibitors at the show include: Oando, Aggreko, ABS, Aker Solutions, Atlas Copco Nigeria, Chevron Nigeria, Eni, First bank Nigeria limited, Exxon, Total, Yokogawa and GE.

NOG 2017 will welcome key players in Nigeria's oil and gas sector.

> **"Falling oil prices as well as the challenge of unstable markets has created uncertainty in the oil and gas industry"**

The event will see a number of speakers taking the spotlight, Senator Donald Omotayo Alasoadura, chairman - senate committe on petroleum resources, Dr. Emmanuel Ibe Kachikwu, honourable minister of state for petroleum resources and Patrick Olinma, executive director of Oil & Gas Commercial at Total E&P Nigeria Ltd.

Despite last year's event being cancelled, the 2015 show proved to be a success. The global oil and gas sector is faced with a number of challenges, falling oil prices as well as the challenge of unstable markets has created much uncertainty. These issues were addressed under the key themes as follows: 'The Changing Face of the Oil and Gas Industry,' 'A New Era for Gas and Power,' 'Effective Solutions Driving Industry Change,' 'The Rise of Nigerian Independent Producers,' 'Security Challenges faced by the Nigerian Oil and Gas Industry,' 'The journey to transformation,' 'Accessing financing' and 'Nigerian Content.' The discussions led to a number of key recommendations that focused on protecting oil and gas assets in the country, addressing corruption as well as the bigger role Nigerians have to play in safeguarding national assets.

Praising the organisers of the annual event H.E.Goodluck Jonathan, Former President, Federal Republic of Nigeria said, "I would like to thank the organisers of Nigeria Oil & Gas… this annual event has grown to be the most prestigious assemblages of experts and investors interested in the Nigerian oil business and its environment."

Dr. Tim Okon, former group general manager, Corporate Strategy, NNPC also noted, "[NOG] is part of communicating effectively and frequently. We have an internal audience and an external audience. It's important for Nigerians to know what's going on."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CORPORATE SOCIAL RESPONSIBILITY FOR AFRICAN OPERATORS

It has become increasingly important for oil and gas operators to meet legal and ethical obligations in terms of corporate social responsibility. *Oil Review Africa* editor Georgia Lewis examines how this can be a win-win for operators and communities.

Image Credit: John and Melanie (Illingworth) Kostopoulos/ Flickr

Bioko Island, a territory of Equatorial Guinea, has benefited enormously from CSR programmes.

CORPORATE SOCIAL RESPONSIBILITY (CSR) is a broad term and it can mean different things to different businesses. Generally speaking, the definition in Business Dictionary.com offers a good starting point: "A company's sense of responsibility towards the community and environment (both ecological and social) in which it operates. Companies express this citizenship (1) through their waste and pollution reduction processes, (2) by contributing educational and social programs, and (3) by earning adequate returns on the employed resources."

For oil and gas operators in Africa, CSR is becoming a more prominent priority and at conferences across the continent, companies are increasingly becoming more open about their activities in terms of community involvement, environmental protection and, in particular, creating jobs particularly in countries where there are local content regulations in place, such as Ghana, Mozambique and Nigeria. Employee welfare and wellbeing can also fall under this remit, such as programmes to ensure the mental health of staff.

Using technology to meet environmental goals

Gbenga Onadeko, programme committee co-chair for the African Energy and Technology Conference, which was held in Kenya in December 2016, told Oil Review Africa about the improvements that have been made among African hydrocarbons operators. Using technology to improve environmental stewardship was cited by Mr Onadeko as an example of this trend.

"Of late, many operators and service companies have incorporated sustainability in their vision statements."

"As a whole, our industry recognises the need for continuous improvement, this in turn has become one of the main drivers for innovation," said Mr Onadeko. "We continue to work on opportunities to reduce the oil and gas footprint at locations by utilising pad drilling, light intervention technologies, enhanced oil recovery and processing of waste water."

Mr Onadeko said that lessons were learnt in the wake of the 2010 Macondo oil spill in the Gulf of Mexico.

"A solution that rose from the aftermath of the Macondo tragedy was a joint industry development project to develop and make readily available containment devices in the unfortunate event of spills," he said. "Those devices are strategically located around the globe, with one available in Africa. Further, there are regular drills by different companies to ensure their readiness to deploy this technology as necessary."

Improved well technology also plays a role in lessening the environmental impact of oil and gas operations, according to Mr Onadeko.

"Horizontal and multi-lateral wells have assisted in reducing the footprint thereby requiring less numbers of wells to drain a specific reservoir, " he told *Oil Review Africa*. "There are several companies that are developing completion technologies which can be deployed with lighter rigs, allowing drilling and completion of long well sections thereby maximising the reservoir contact for drainage."

He said that such completion systems provide in-situ disposal of unwanted fluids, eliminating the need to process them on the surface: "It makes sense to minimise the amount of energy expended in the exploration and development of hydrocarbons."

"Even though the oil and gas industry is considered as conservative, large amounts of R&D dollars are still spent on developing solutions for the future, albeit [this is] being challenged by the current industry environment," he said (For more from Mr Onadeko, turn to page 50).

Friburge Oil & Gas, an Angola-based service company also offers an example of how technology can help meet environmental goals. It has signed an exclusive contract with Nature Oil & Gas, the Norwegian waste treatment company, to provide water treatment services for hydrocarbons operators in central and west Africa.

The technology complies with zero discharge regulations for operators either offshore or working near inland bodies of water, such as rivers and lakes. With a standard of 15ppm of contaminants in treated water at disposal, the technology involves treating water in situ and disposing of it at the site. This

Image Credit: UBA. Opposite page image credit: John and Melanie (Illingworth) Kotsopoulos/Flickr

Above: Hannah Akahoho Sebbefia, NEC essay contest winner.
Opposite page: Bioko Island has benefited from an anti-malaria CSR programme.

saves on transport costs as well as being environmentally friendly.

The importance of water management as part of an environmental stewardship strategy was one of the main conclusions from the 2017 Global Opportunity Report, which was released by DNV GL, Sustainia and the United Nations Global Compact.

Disruptive technologies were highlighted as a particular way to improve water management with smart water tech coming out as a means of improving water management and as a market opportunity.

The report named smart water technology at the top of the list for the most impactful and applicable of the 15 different opportunities discussed by the authors. It referred to technology that automatically saves and reuses water, protecting it in regions where water is scarce and providing sustainable options for communities. This finding supported the tendency in past Global Opportunity Reports to address issues in meeting the United Nations' sustainable development goals, such as providing and managing access to water, as a means of creating market opportunities as well as meeting CSR aims.

Meeting CSR goals along the supply chain

An important aspect of CSR is to ensure goals are met along the entire value chain. This is something that has become very important in recent years. In 2012, for example, Tullow Oil's Ugandan operations won the award for Most Responsible and Ethical Supply Chain at the East African CSR awards.

The company was recognised for its "Closing the Gap" programme which has awarded contracts to more than 550 Ugandan-owned companies supplying goods and services. This represented more than 50 per cent of Tullow's suppliers in Uganda, covering services such as catering, mechanical, transport and security.

Charitable works

Establishing a charity or foundation is another way companies can give something back to the communities in which they operate.

The Oando Foundation, an independent charity launched by Oando Plc, won the CSR Initiative award at the 2013 Africa Oil & Gas Awards. This was in recognition of the foundation's work in regard to improving public schools across Nigeria.

The project's main focus is identifying, adopting and renovating dilapidated public schools, to improve the quality of learning infrastructure. There is also the Oando Scholars Programme which sponsors students at each adopted school, covering such costs as tuition, transport, uniforms and study materials.

Additionally, teacher training, full implementation of the ICT curriculum, providing libraries and digital resources to schools, and early childhood development centres are all part of the foundation's remit.

Tokunboh Durosaro, Director of the Oando Foundation, said that the foundation's work "continuously [supports] government's efforts aimed at improving access to quality basic education for all citizens."

Like Oando, Kuwait-based international logistics provider, Agility, has a multi-faceted, international CSR programme. For the last three years, the company, which operates in more than 100 countries, has released a CSR report to showcase its commitment to ethical business conduct, employee rights, safety, environmental concerns and community investment.

African countries have been among the beneficiaries of Agility's CSR programmes. The 2016 report said that it has responded with relief programmes for more than 40 countries, including the Democratic Republic of Congo and South Sudan. For the past 10 years, Agility has invested in community projects, including secondary school scholarships for 100 girls a year in Ghana.

Additionally, workplace diversity is another CSR aim with more than 7,000 workers trained across Africa, the Middle East and Asia since 2011.

"All of the initiatives we've undertaken to better our company and our communities can be advanced. I'm particularly proud of our employee volunteers, who've had an enormous impact on communities around the world," said Agility CEO Tarek Sultan.

Healthcare programmes

Helping emerging economies meet vital healthcare goals is a common aspect of many CSR programmes. An example of this is Marathon Oil's Bioko Island Malaria Control Project. Located off the coast of Cameroon, this Equatorial Guinean territory is the beneficiary of Marathon's main social responsibility project. Since the programme started in 2003, the malaria caseload on the island has decreased by 74 per cent and the mortality rate for children under five years old has declined 64 per cent, according to government figures. The company is also helping build capacity across Equatorial Guinea for assuming responsibility for its own malaria control programmes in the future.

Image Credit: Matthew and Heather/Flickr

As six exploration blocks are set to be developed in the Lake Malawi National Park, the CSR activities of the operators will be under the spotlight because of campaigning by pressure groups.

Using other industries to set an example

Case studies from industries outside of oil and gas can offer useful guidance for companies seeking to boost their CSR programmes. In November 2016, pan-African banking group UBA won best CSR/Sustainability, West Africa award at the 10th Social Enterprise Report Awards.

The bank's UBA Foundation was commended for its work across Nigeria and beyond with its Read Africa projects and scholarship grants given to winners of the National Essay Competition. The essay competition featured finalists from Ghana, Nigeria and Senegal.

The Read Africa project aims to revive the culture of reading among young Africans, with a focus on informative and educational books. The project involves providing works of English literature to junior and senior secondary school students across the African continent. Starting with Nigeria, Read Africa now has a presence in 20 African countries.

Senior management from UBA visit the schools when the books are presented to set an example of what can be achieved with an education. As well as providing books, the programme also features mentoring to improve the literacy skills of students.

Education has become an important part of UBA's CSR programme. Other educational initiatives include financial support for an education sector reform project to train eight consultants to the Nigerian Federal Ministry of Education; collaboration with Narita Learning Centre and leading child psychologist Derek Jackson to provide expert advice to parents, teachers and school administrators; and collaboration with educational consultants, McCrae & Co, to provide a study technology workshop to help public school teachers acquire new methodologies.

Moving to gas and renewables to meet environmental goals

Simply investing in gas projects, with natural gas being the cleanest-burning of the fossil fuels, is an obvious way for operators to meet green energy goals as part of being responsible corporate citizens. Providers of finance are also leading the way in this regard.

In December 2016, the International Finance Corporation (IFC) and Multilateral Investment Guarantee Agency (MIGA), members of the World Bank Group, announced the commitment of US$517mn in debt and guarantees to support Ghana's Sankofa Gas Project. This is an integrated offshore oil and natural gas project that will provide up to 1,000 megawatts of power generation. The US$7.7bn Sankofa project will be developed by Vitol Ghana and Eni Ghana in partnership with Ghana's National Petroleum Corporation.

The Ghanaian government has identified the Sankofa project as one of two transformational projects that will help the country achieve its commitments as per the Paris Agreement for climate change mitigation. Once it goes into production, which is slated for early 2018, the project is expected to reduce carbon emissions in Ghana by an estimated 1.6mn metric tons annually as gas displaces oil as the fuel of choice for power

generation. This is the equivalent of taking 1.2mn cars off the road each year or planting 152mn trees. In terms of meeting financial goals, Sankofa is expected to generate US$2.3bn in revenues for the Ghanaian government and provide a long-term, stable gas supply to assist with energy security.

Ian Taylor, CEO of Vitol Group, said, "This is a transformational project for Ghana at an important time. The World Bank Group's involvement, including financing from IFC and MIGA, is enabling Ghanaian gas to be used for the benefit of Ghana's economic development."

As well as investment in gas projects. many oil and gas companies have seen the benefits, socially, environmentally and financially, in investing in renewable energy. As many countries, including those across Africa, move towards incorporating a higher proportion of renewables into the energy mix, it makes sense of hydrocarbons operators to invest in alternative forms of energy.

There are opportunities to make money from renewables projects. Indeed, oil and gas companies can be at an advantage because fossil fuel-powered plants are frequently still used as a back-up when renewables are not as effective. Gas, in particular, is a useful bridging fuel as the world moves towards a lower carbon future and strives to meet energy security goals. It can make good environmental and economic sense to invest in renewables alongside traditional forms of energy.

The 2016 edition of the BP Statistical Review of World Energy, which sets out energy data for 2015, revealed a year in which significant long-term trends in the global demand and supply of energy came to the fore with global energy consumption slowing further and the mix of energy sources shifting towards lower-carbon fuels. According to the 65th editon of the review, global natural gas production grew by 2.2 per cent, more rapidly than consumption but below its 10-year average of 2.4 per cent. Growth was above average in North America, Africa, and Asia Pacific.


Image Credit: Oando

The Oando Foundation's education programmes have played an important role in ensuring schools are provided with the resources they need, such as textbooks and IT equipment.

When the 2016 edition of the review was launched, BP Group chief executive Bob Dudley said: "As this edition of the stats review clearly demonstrates, the world of energy is again going through a period of profound change. But this is nothing new for our industry."

"Our task as an industry is to take the steps necessary to ensure our resilience in the near term, while continuing to invest to meet the energy needs of the future," he added.

The reality of meeting CSR challenges

While many operators and service providers may start out CSR programmes with good intentions in terms of environmental stewardship and social development – or because of customer and employee expectations – a new report from Bain & Company, "Achieving Breakthrough Results in Sustainability", has found that only two per cent of CSR programmes achieve or exceed their aims, compared with 12 per cent of other corporate transformation programmes.

Bain came to this conclusion after surveying more than 300 companies that are engaged in sustainability transformation programmes and interviewing the heads of sustainability at companies that have been recognised for their sustainability results.

"Too often, sustainability gets stuck in first gear, while the need for change is accelerating," said Jenny Davis-Peccoud, who leads Bain's Sustainability & Corporate Responsibility practice. "Once companies learn to navigate common roadblocks, they open the door to a transformational journey and the potential to leave a legacy, prompting companies to redefine what it means to be a leader in their industry."

Bain's research revealed that many employees do not see sustainability as a business imperative. More than 60 per cent of survey respondents cited public reputation as the main driver for sustainability change. Other reasons for de-prioritising sustainability included perceived business trade-offs and an absence of incentives. Additionally, a lack of resources and competing priorities were cited as the top two obstacles that threaten CSR programmes, with less than a quarter of the survey respondents saying they are held accountable for such initiatives through incentives.

Working closely with pressure groups, particularly environmental activists, can be a challenge for governments and investors in oil and gas projects. For the stakeholders in the project to explore Lake Malawi for oil, this will undoubtedly influence the type of development that takes place at the site.

Environmentally sustainable development will be under the spotlight with groups such as the Natural Resources Justice Network (NRJN) and its

affiliated chapter of Publish What You Pay (PWYP) writing to the UNESCO World Heritage Committee in regard to concerns about the integrity of Lake Malawi National Park. NRJN and PWYP have asked the committee to take action to protect the park and have demanded the Malawi government provides all information to the public about the status of and its position towards oil exploration at the site.

The Lake Malawi site will be closely watched in terms of environmental stewardship as suspension of exploration has been lifted and all companies have been given the green light to continue exploration across three land blocks and three blocks in the lake.

Image Credit: Oando

The Oando Foundation has been instrumental in helping children learn valuable ICT skills.

Guidelines for successful CSR implementation

Despite the hurdles companies face in meeting CSR goals, Bain concluded its report with four guidelines to help companies overcome the odds and enjoy lasting gains from sustainability programmes.

Make a public commitment: Many executives hesitate to make their goals public, fearing reprisal from third-party watchdogs if they fall short. Sustainability leaders manage that downside risk by engaging proactively with stakeholders. They affirm that the benefits of public commitment significantly outweigh the risks by creating a shared sense of mission and helping companies stay the course during difficult phases.

CEOs to lead by example: Our research shows senior leadership support is the most important factor contributing to success, and visible actions—not just words—make the difference. CEOs create the vital lift-off energy for sustainability efforts and regenerate momentum throughout the journey.

Highlight the business case: Sustainability leaders help employees understand the business case that links sustainable products and processes with success, and there's no shortage of proof. Growth for brands with a demonstrated commitment to sustainability was four times faster than non-sustainable products in 2015, according to the Nielsen Global Corporate Sustainability Report.

Hardwire change through incentives and processes: Companies that achieve ambitious sustainability goals embed sustainable behaviors and processes throughout the business and make line managers responsible for delivering results. For example, some companies change their capital-approvals process to include sustainability factors, or increase time horizons in business case assessments, allowing more initiatives to qualify for investment.

Image Credit: Oando

Funding education programmes is a popular way for oil and gas operators to give back to communities.

LEKOIL: MULTIPLE OPERATIONS IN NIGERIA AND NAMIBIA

Since its inception in 2010, LEKOIL has run projects across Nigeria and Namibia. These projects include exploration, appraisal and production assets in oil and gas, and the company is committed to being a responsible operator in all its locations.

LEKOIL IS AN indigenous oil and gas company with interests located in Nigeria and offshore Namibia.

The company was founded in 2010 by a group of leading professionals who seek to lead the company, as per its mission statement, "to be the world's leading exploration and production company focused on Africa"; and to build a multi-asset oil and gas exploration, development and production business in Africa.

LEKOIL's assets include a producing asset, an appraisal asset, two exploration assets and a gas subsidiary.

Producing asset: Otakikpo marginal field

LEKOIL has a 40 per cent interest in this field. Otakikpo lies in a coastal swamp location in OML 11, adjacent to the shoreline in the southeastern part of the Niger Delta.

Appraisal asset: Ogo discovery, OPL 310

LEKOIL has a 40 per cent interest. OPL 310 is located in the Dahomey Basin on the West African Transform Margin. The block extends from the shallow water continental shelf close by the City of Lagos, into deeper water.

Exploration asset: Known basins, OPL 325

LEKOIL has a 62 per cent interest in this asset. The OPL 325 licence area, located in the offshore Dahomey Basin within the wrench zone that straddles the western Niger Delta, is 50km to the south of OPL 310.

Exploration asset: Frontier basins, Namibia, Blocks 2514A and B

LEKOIL has a 77.5 per cent interest as the operator. LEKOIL's two blocks are in the Luderitz Basin offshore Namibia with a combined acreage of some 10,000 sq km .

LEKGAS

LEKGAS is a wholly-owned subsidiary of LEKOIL. LEKGAS is the gas midstream vehicle of LEKOIL, building strategic, commercial and technical partnerships with world-class companies to unlock gas and gas-to-power opportunities mostly in Nigeria which is LEKOIL's primary country of operations.

Image Credit: LEKOIL

LEKOIL is operating responsibly across Nigerian and Namibian oil and gas projects.

LEKGAS has a dual focus of monetising LEKOIL's equity gas globally as well as participation in the gas infrastructure space in Nigeria. As such, LEKGAS is structured as Developer, Operator and Investor in midstream gas assets to connect both equity and non-equity gas from the Upstream (field location) to the Downstream (wholesale customers).

LEKOIL Community

LEKOIL is dedicated to maintaining high, ethical standards in our business activities and we are committed to the overall welfare and development of the communities around us. LEKOIL's corporate social responsibility (CSR) plan focuses on three strategic areas: Education; economic empowerment (women and children development); and environmental sustainability.

Through our demonstrated commitments to the economic and environmental health of Nigerian communities, our aim is to make meaningful impact with the initiatives we implement. We continue to reflect this in our values, culture, decision making, strategy and day-to-day operations. In conjunction with our world-class partners, we excel in deploying innovative technologies to realise superior returns on our assets, growing with our stakeholders while preserving the environment.

DEEPWATER OPPORTUNITIES FROM ANGOLA TO SENEGAL

Enormous offshore opportunities are in the spotlight for 2017. These include established markets, such as Nigeria and Angola, as well as emerging players, such as Senegal and Mauritania. Moin Siddiqui offers his analysis.

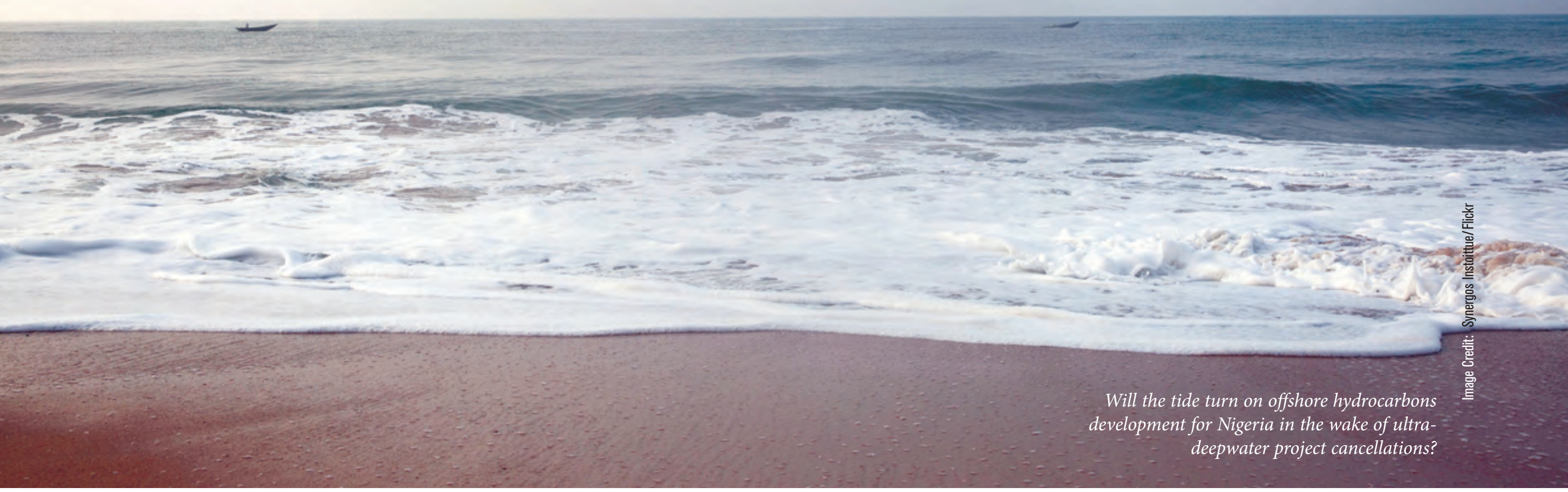

Image Credit: Synergos Institute/Flickr

Will the tide turn on offshore hydrocarbons development for Nigeria in the wake of ultra-deepwater project cancellations?

THE WEST AFRICA sub-region stretching from Angola's coast in the south Atlantic to the Gulf of Guinea and edges of Mauritania-Senegal maritime border in the north Atlantic Ocean has yielded world-class oil-and-gas discoveries in recent decades. The reserve estimates have increased steadily and yet only a small percentage of offshore acreage has been explored. it is the majors that will boast a competitive advantage in ultra deepwater, given the technical complexity of greenfield offshore fields, colossal capex and longer lead times from discovery to sales.

In sub-Saharan Africa (SSA), capex in the hydrocarbons sector has been reduced by US$100bn over the next five years.

"Exploration cuts in the region will also contribute to a longer-term production slump as explorers have shied away from greenfield prospects, in favour of appraising known discoveries," noted energy consultancy Wood Mackenzie. Nigeria and Angola have borne the brunt of these cuts.

The report highlighted: "Deepwater has suffered most due to its high breakeven price relative to other sectors. The confirmation of the giant Owowo discovery in deepwater Nigeria shows the quality of resources SSA still has to offer."

Economic considerations in a low oil price scenario

The economic feasibility of deepwater fields vary, however, oil-prices of $65-70/barrel (sustained over the medium-term) ensure the viability of most deepwater developments. A number of flagship projects notably in Nigeria and Angola have been cancelled, or deferred, due to low oil-prices – hence making ultra-deep water prospecting uneconomical. The cost of drilling deepwater wells exceeds US$100mn, according to industry experts. Energy project funding in today's risk-averse climate is challenging, leading to growing competition between east and west Africa for limited exploration budgets of the international oil companies (IOCs).

New capacity across west Africa

2017 should see a gradual revival in west Africa's upstream activity across both core and least-explored countries. Angola has eight planned offshore projects, of which three are due online in 2017 (sanctioned before price-slump). They include: Total's Kaombo adventure; Chevron's Mafumeira Sul; and Eni's East Hub project – contributing (together) about 150,000bpd by the end of 2017 – rising eventually to 305,000bpd within the next few years. However, the new capacity additions are more likely to sustain Angola's production at or slightly above current levels over the medium-term rather than providing a substantial boost – in view of natural depletion of several older deepwater fields.

Moho-Bilondo is the largest successful expedition to tap the Congo Brazzaville's deepwater reserves, where Total in partnership with Qatar Petroleum expects to start production from Moho Nord and southern (Phase-1B) concessions – yielding 100,000bpd by late 2017.

South of Congo may hold large deposits of bitumen, ie, oil sands – estimated at 2.5bn barrels 'in-place' and 500mn barrels of 'recoverable' resources. The project (if undertaken) would be the first tar sands development in Africa costing US$7.5bn according to Eni – unlikely in the foreseeable future.

Equatorial Guinea awaits FID for FLNG

In Equatorial Guinea, a final investment decision (FID) on the Fortuna Complex floating liquefied natural gas (FLNG) project by Ophir Energy (UK) is expected by June 2017. The field is forecast to produce 2.2mn tonnes/year from 2020. Estimated in-place and recoverable mean resource numbers for the eastern lobe of the Complex are 553bcf and 426bcf, respectively, based on Ophir data.

Last June, a bidding round for 37 exploration blocks was launched (32 offshore) – with licences scheduled to be awarded during the first quarter 2017.

Offshore Nigeria: opportunities and risks

Nigeria's offshore basins are mostly untapped with fresh capacity of nearly 1.1mn bpd achievable if eight greenfield projects are executed in coming years. That, in turn, should boost Africa's top producer's sustainable capacity above 3mn bpd and help to offset the natural decline in output.

Thus far, just one scheme has received FID – namely Total's 200,000-bpd Egina development (due online 2018). The 125,000bpd Usan deepwater field was the last major oilfield to come online (February 2012).

Very few, if any, IOCs will sanction new investments in costly offshore fields until the 'long-delayed' Petroleum Industry Bill (PIB), currently blocked in parliament, becomes law – though this unlikely to be soon. Weak oil-prices have also exacerbated project delays on top of regulatory uncertainties.

Image Credit: Embassy of Equatorial Guinea/Flickr

Will a final investment decision on a new FLNG project improve Equatorial Guinea's economic prospects?

PSCs in Nigeria

In recent years, production-sharing contracts (PSCs) on new deepwater projects were more favourable compared to onshore/coastal areas in joint-venture arrangements. As an incentive, IOCs received a higher share of revenue as the water depth increases.

But the PIB proposes to increase the Federal Government's share in PSCs and impose higher taxes on deepwater projects. IOCs cautioned that tougher fiscal terms undermine the viability of new upstream projects, especially in high-risk offshore terrain – hence the ongoing review of such projects.

Ghanaian growth in offshore

Offshore Ghana still holds large quantities of stranded hydrocarbons resources, which have been discovered but remain underdeveloped because of physical and economic factors.

Presently, half of the sedimentary basin offshore is open with modest activity; while the Voltaian basin (area: 103,000 sq km) is undergoing some level of exploration.

About US$20bn of investment in the medium-term, mainly from IOCs is expected to develop three concessions: the Deepwater Tano/Cape Three Points block; the Tweneboa/ Enyenra/Ntomme (TEN) block; and the Sankofa block. Ghana National Petroleum Corporation (GNPC) projects output at 240,000bpd by 2020, when the three blocks should be at their respective peak.

The UK's Tullow Oil (Jubilee field operator) is also developing TEN project – covering an area of 800 sq km – where a total of 33 wells were drilled, including 15 oil production, 15 water injection, one gas production and two gas injection wells.

The three fields were jointly developed using a single floating, production, storage and offloading (FPSO) facility – tied-in to subsea infrastructure.

First oil-flow was achieved in August 2016, with a peak production rate of 80,000bpd expected by 2018, plus 50mcf per day of natural gas. The project (costing US$6bn) is expected to

Image Credit: NASA Johnson/Flickr

An aerial photo of the Senegalese coast, which is the site of extensive offshore hydrocarbons development.

> **"Ultra deep-water plays are underexplored but the potential for lucrative earnings in west Africa is undeniable for stakeholders"**

recover some 216mn barrels of oil – in water depths of 1,000m to 2,000m – the largest upstream development in SSA during 2016.

Another 16 wells could be drilled in the future, depending upon the production levels.

Ghana plans to develop non-associated gasfields at the Offshore Cape Three Point (OCTP), which is estimated to contain 1.5 tcf of gas in-place and about 500mn barrels of oil in place.

First oil is expected this year, followed by natural gas in 2018. The operator is Eni – in collaboration with Swiss-based Vitol. The project involves the building of a FPSO facility with a capacity of 58,000bpd.

Senegal: the new major player for west Africa

Senegal is a new hotspot for IOCs following hefty gas finds by Kosmos Energy in the Greater Tortue area – containing more than 50 tcf of resource potential – split in half between Mauritania and Senegal – enough to merit a FLNG project, if agreement can be reached on its location.

The Wood Mackenzie report said: "We think it's a world-class asset with a good upside." In Senegal's southern offshore area (covering some 7,490 sq km) lies the SNE field discovered by Australia's FAR Petroleum in 2014 – whose probable reserves assessed by Scotland-based Cairn Energy at 200-385mn barrels – further upgrade is probable.

Other frontier areas across west Africa: Côte d'Ivoire, Liberia, Gambia

In other frontier areas, Anadarko Petroleum (US) holds interests in five Côte d'Ivoire offshore blocks (covering 5,665 sq km). Anadarko is conducting in-depth exploration and appraisal of its Paon discovery in 2012.

This year, ExxonMobil plans to drill a well in Liberia. The Liberia basin consists of 30 concessionary blocs, of which 13 are ultra-deep with water depths of 4,500m.

In 2015, US junior Erin Energy completed seismic surveys of blocks in Gambia, which, it reported, are "on trend" with FAR oil finds in Senegal, while Woodside Petroleum (Australia) is active in Guinea Bissau in collaboration with African-focused companies. Impact Oil-and-Gas. Cameroon's Douala, Manyu and Kombe-NSPE and Bakassi basins (near Nigerian waters) also offer exploration and development opportunities.

Conclusions: A bright future for the brave

West Africa – which is now boasting new oil output capacity of 3mn bpd and gas liquefaction of 22mn tonnes per year – is critical to global energy supply. The opportunities both for exports and increasing power supply domestically are indeed significant.

Wood Mackenzie expects a slow recovery for exploration, adding that operators will benefit from cost deflation and will improve efficiency through streamlining project design.

Investing in ultra deep-waters remains risky, but the potential for lucrative earnings in this under-explored region of west Africa is undeniable for stakeholders. Host countries need to revive their upstream oil-gas sector by offering attractive fiscal terms rather than seeking to increase state revenues in today's risk-averse climate.

Large-scale exploration activity also requires higher oil-prices over medium-term. The low oil price scenario has become a long-term situation, but will the industry's fortunes change in the ever-changing world of 2017?

Moin Siddiqi is an economist and regular contributor to Oil Review Africa.

Image Credit: Eni/Flickr

The Jubilee operation off the coast of Ghana is one of the most promising west African projects. It heralded the birth of Ghana as an oil-producing country.

TRANSPARENCY AND LOCAL CONTENT RULES TO BE TIGHTENED IN GHANA?

President Nana Akufo-Addo's New Patriotic Party credits itself with the development of Ghana's oil and gas industry. But what will the new president's election mean for the country's hydrocarbons operators? Amalia Illgner reports.

GHANA'S NEW PRESIDENT, Nana Akufo-Addo, of the New Patriotic Party (NPP), has vowed to "get Ghana back on the path of progress and prosperity", following an era in which the West African nation received several bailouts from the IMF. And part of the NPP's winning platform was a pledge to create an "enabling" environment for oil and gas investment.

This means promises to incentivise oil exploration in the Voltaian, Keta and Accra Basins, develop a long-term LNG utilisation programme and support the private sector in developing extra natural gas.

"The NPP credits itself with establishing the oil and gas sector in Ghana and it's clear it wants to build on this image", says Malte Liewerscheidt, senior Africa analyst at Verisk Maplecroft. But Christopher Haines, head of oil & gas, at BMI Research, says, for now, the new president's commitments to the sector are "largely words". Haines is skeptical of the merging of the Power and Petroleum ministries, one of the new President's first initiatives. "The threat here is that it consolidates too much power in one ministry".

Liewerscheidt says we might see a tightening of local content regulations as the president encourages local businesses to participate in the supply chain.

Image Credit: StateCraft

President Nana Akufo-Addo is expected to be an assertive figure in overseeing hydrocarbons growth in Ghana.

"We expect the government is likely to become more assertive in pushing for the fulfilment of local employment quotas."

Further afield, experts are looking out for whether Mr Akufo-Addo will achieve a "final resolution" on the maritime border dispute with Côte d'Ivoire, which, says Haines, would help offshore exploration.

> **"The New Patriotic Party credits itself on establishing the oil and gas sector in Ghana and it's clear it wants to build on this image"**

But it is in Mr Akufo-Addo's commitment to improving transparency that experts are most interested. Ghana slipped on Transparency International's Corruption Perceptions Index in 2016, scoring just 43 out of a possible 100, compared to 47 in 2015. This was the lowest score since 2012, making Ghana the second-worst country globally of those ranked in terms of places dropped in a year. A number of high profile public corruption scandals contributed to the drop, and the president has declared tackling corruption as a priority.

During the campaign he pledged to pass the "Right to Information" Bill and Liewerscheidt believes this could boost transparency in the oil and gas sector. "For instance, the government could make good on the outgoing administration's promise to publicly disclose all present and future oil contracts."

However, Daniel Richards, Sub-Saharan Africa Analyst, BMI research is cautious."Time will be the determinant to whether this avowed commitment to tackling corruption plays out, but the oil and gas sector is one that is likely to come under intense scrutiny", he says.


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LEVERAGING BIG DATA FOR EFFECTIVE OPERATIONS

As Sierra Leone joins an International Monetary Fund big data initiative that has the potential to impact on oil and gas decision-making, Joacim Vestik-Lunde, CEO - Business Assurance for DNV GL, explains how all industries can optimise big data for great results.

Image Credit: Codelco/Flickr

Big data can be overwhelming but programmes such as IMF's General Data Dissemination System help streamline information.

AS THE OIL and gas industry becomes more technologically advanced, big data is playing an ever-increasing role. When properly leveraged, big data can be harnessed to increase productivity, safety and operational excellence. Across Africa, operators are realising the benefits of good data management and this is having a positive impact on oil and gas as well as other sectors.

Sierra Leone, for example, has implemented the International Monetary Fund's (IMF) General Data Dissemination System (GDDS), which publishes essential macroeconomic data through a new National Summary Data Page (NSDP). This is an efficient way to access information that the IMF has determined to be critical for monitoring economic conditions and policies. This puts Sierra Leone among the first wave of countries to implement this programme.

The NSDP serves as a one-stop publication site for data in human and machine-readable formats. In Sierra Leone, the NSDP is posted on the websites of Statistics Sierra Leone, Bank of Sierra Leone and the Ministry of Finance and Economic Development. It utilises the Statistical Data and Metadata Exchange (SDMX) on the Open Data Platform provided by the African Development Bank.

In relation to oil and gas specifically, the user guidelines for the GDDS cite a broad endorsement from the IMF directors that participants "should be encouraged to provide additional metadata on oil and gas activities and products under the existing data categories of the GDDS."

The directors noted that the GDDS initiative would "promote public knowledge and understanding of how countries incorporate oil market information when compiling macroeconomic indicators."

> **"IMF directors broadly endorse the idea that participants in GDDS should provide additional metadata on oil and gas activities "**

Leveraging big data

Joacim Vestvik-Lunde, CEO of DNV GL - Business Assurance, writes about how all industries can benefit from best practice leveraging of big data:

Fifty-two per cent agree that big data represents an opportunity from a business point of view, while only 23 per cent have a clear strategy. It is however evident that the topic is high on company agendas as 65 per cent are planning for a future where big data plays a significant role, and 76 per cent plan to maintain or increase big data investments.

customers and market better and make decisions based on updated information and boost productivity or results. The majority of companies in the survey have embarked on this journey – half of the companies

> **“Big data is changing the game in a number of industries and representing new opportunities and challenges”**

These findings emerge from an international survey conducted by DNV GL - Business Assurance and the research institute GFK Eurisko, on close to 1200 professionals from businesses in different sectors in Europe, the Americas and Asia.

Big data represents an opportunity for more than half of the companies interviewed – even 70 per cent for companies employing more than 1,000 people – and 45 per cent recognise the direct importance of big data for their own business.

Although big data is high on the agenda, only one in four are able to leverage big data to boost productivity, showing that most companies are only starting to leverage the potential.

“Big data is changing the game in a number of industries, representing new opportunities and challenges. I believe that companies that recognise and implement strategies and plans to leverage the information in their data pools have increased opportunities to become more efficient and meet their market and stakeholders better,” says Luca Crisciotti, CEO of DNV GL – Business Assurance.

Realising benefits of big data starts with implementing technology and analytics enabling organisations to draw insights from their data pool. The benefits come when you are able to understand your business, interviewed implemented at least one big data-related initiative.

Most efforts are made to enable and prepare the organisation for utilising big data to the full extent. Twenty-eight per cent have improved information management and 25 per cent have implemented new technologies and methods. Fewer have taken actions impacting daily routines: 16 per cent have worked to change the culture or organisation, and 15 per cent changed their business model.

All companies that leverage big data report concrete benefits from the efforts. Twenty-three per cent report increased efficiency, 16 per cent see better business decision-making and 11 per cent reported financial savings. Sixteen per cent have improved customer experience and engagement because of big data, and nine per cent improved relations with other stakeholders.

The main factors preventing companies from making more progress relate either to the lack of an overall strategy and of technical skills, both counting for 24 per cent.

Big data offers a world of opportunities that companies should not miss out on. Most companies (57 per cent) believe that big data will play a key role in the mid-term and are preparing for this (65 per cent). A majority plan to maintain or increase investments (76 per cent). They also plan significant changes for their workforce, by

Image Credit: Development Planning Unit University College London/Flickr

Modernising big data will play an important role in Sierra Leone's development.

either developing specific in-house competences (47 per cent) or working through dedicated partnerships (20 per cent).

“The ability to use data to obtain actionable knowledge and insights is inevitable for companies that want to keep growing and profiting. The data analyst or scientist will be crucial in most organisations in the near future,” adds Luca Crisciotti.

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Regular maintenance, rather than waiting for something to go wrong, is essential for effective operations and process safety.

Image Credit: mallix/Flickr

IMPROVING THE SAFETY CULTURE FOR SUSTAINABLE BUSINESS

Process safety is essential for a sustainable business, writes Euro Petroleum Consultants DMCC president, Colin Chapman and project manager, Ekaterina Kalinenko. They outline the major issues and advise on how operators can make improvements with multiple benefits.

THE SIGNIFICANCE OF process safety for sustainable development cannot be overstated.

The increased rate of incidents leading to multiple fatalities, as well as financial losses, are a prime illustration of this. Companies risk repeated accidents unless thorough investigation and analysis are conducted to understand the root causes. They need to learn from accidents to ensure they are never repeated, and make improving the safety culture a major priority for a sustainable business model.

The most important issues for continuous improvement are:

- Sustainability
- Energy consumption and efficiency
- Control of carbon emissions
- Increase in the share of renewables and clean fuels
- Options for changing the crudes mix for production
- Cost monitoring and control
- Process lifecycle agement
- Overall pro-active safety approach
- Equipment maintenance, reliability and process safety management
- Operator capability management
- Staff training, especially new staff
- Knowledge and change management; online, model-based decision support with instrumented/automated systems
- Collaboration and teamwork
- Reduction of technical support cost

Asset integrity is critical to increased performance and margins, reduced operational costs, and mitigation of risks. No corporate programme goals can be achieved unless a robust system of facility management is developed and implemented. Asset integrity includes routine maintenance, non-routine maintenance, turnaround and inspection. Maintenance must not be limited to firefighting mode with work priorities changing continuously, but should aim for stable operations mode.

Improving maintenance performance often needs review by independent external experts to highlight where changes are necessary, both for routine and non-routine events.

Companies needs to address the following questions:

- Are the right computerised management systems in place?
- Is root cause analysis practiced to avoid repeat maintenance occurring?
- Are repairs to plants essential to the refinery's economic performance prioritised?
- Does the company practice preventative maintenance techniques?

The main activities needed to safeguard effective operations include the extension of the ageing assets lifecycle; and optimising existing assets using modern techniques, state-of-the-art instrumentation and a lean approach to new facilities design.

During operation, every asset integrity system element should be constantly maintained by operators and health, safety and environment (HSE) managers, operational limits should be explored and change management procedures should be in place and reviewed when operating conditions change and if an incident occurs.

Traditionally, methods used for asset integrity assurance also include gap analysis and benchmarking, inspections and audits, corrosion evaluation, review and maintenance, and integration of processes with software tools. To maximise productivity a list of KPIs should be developed which incorporates HSE indicators, that are applicable to the asset integrity condition evaluation.

Another instrument that should be taken into account in order to assure safety levels is the hazard identification (HAZID) and hazard and operability (HAZOP) study combination.

The HAZID process should be ongoing to ensure existing hazards are known, and new hazards recognised prior to facility modification, organisational change, abnormal operations, and troubleshooting and condition monitoring, and after an incident or near-miss. The HAZID approach should consider all operating modes of the facility, and all activities that are expected to occur, be dynamic to stay ahead of any changes in the facility, and integrate human and machine/system interfaces together with engineering issues.

The process of HAZID planning and execution requires a number of steps, including preparation, defining the boundaries and providing system description, dividing plant into logical groups, reviewing pipe and instrumentation diagrams (P&IDs) and analysing process schematics to ensure accuracy, and, of course, optimising.

HAZOP is mostly used for identifying hazards and operability problems and can be applied to operating process plants and to plants in various stages of design. The plant to be studied is defined at the beginning of the HAZOP, typically using the P&IDs to clarify the battery limits and interfaces.

The team operates a question and answer approach using guidewords to search for deviations from design intent or failure modes of the plant. Each section is examined critically to understand the design intent of the facilities between nodes selected by the leader. At the end of the HAZOP, a list of recommendations should be provided. These need to be allocated for review and implementation with a budget and timetable. The documentation of HAZOP analyses is often facilitated by utilising a template or a software package.

HAZOP studies should be carried out during the initial design phase, once the P&Is have been fully defined; during normal operations and start-up and shutdown procedures; and during any significant plant modifications. They should also be carried out on a routine basis, at least every five years.

“Managers and specialists involved in production activities should be aware of process hazards and associated risks, tools and procedures”

Training of staff is essential to ensuring HAZID/HAZOP results are successfully implemented. Both managers and specialists involved in production activities should be aware of process hazards and associated risks, tools and procedures to comply with requirements to pass this knowledge to all workers.

One of the main factors that ensures sustainable development of the oil and gas industry is safety in operations as well as non-core activities. One of the main responsibilities of oil and gas players is to guarantee that the processes operate safely for the employees, environment, local residents and other enterprises in the region. In a multicultural society such as in the Middle East as well as in many African markets, it is of utmost importance that all persons involved in the management and operations of refineries and petrochemicals complexes fully understand and follow all safety procedures and requirements.

Image Credit: Shutterstock

A process engineer climbs to the top of a gas dehydration vessel as part of an inspection, which is vital for safety.

REGIONAL DIFFERENCES IN THE AFRICAN ENERGY JOB MARKET

While the low oil price scenario has squeezed staffing levels in the oil and gas industry, there are other factors which are reviving the job market across different regions in Africa. Martin Clark reports on the new opportunities for hydrocarbons jobs.

THE NUMBER OF jobs in the UK North Sea has dropped by about a quarter in the last couple of years because of challenges brought on by the slide in oil prices. Like other producing regions, Africa's energy sector has similarly been affected. Industry experts say they have seen some cutbacks in staffing levels in Africa's oil and gas sector due to the lower global oil price since mid-2014.

However, other factors, such as increasing urbanisation within the region and corresponding growth in demand for energy – combined with a ramping up of production in eastern and southern Africa – should start to cancel these trends out. But there are significant variations.

"Very much so," says one industry insider at energy recruitment firm Petroplan. "If we look at southern Africa first, local producers are primarily focused on building the gas economy, especially in South Africa, to cut reliance both on imports of crude and the use of coal in the power sector."

He adds: "In the short term, therefore, there is substantial downstream scope in South Africa but an ageing workforce could eventually lead to shortages – especially given the slow intake of young workers. Upstream opportunities will follow as midstream and downstream activity helps build the gas

Young Africans may find opportunities in the gas sector, especially in countries with ageing workforces.

Image Credit: World Bank Photo Collection/Flickr

economy. The focus in upstream is likely to be on less capital-intensive onshore development rather than more expensive offshore and deepwater projects. "And these trends could shape recruitment patterns for skilled workers in other areas too, such as West Africa, where much of the continent's high impact upstream activity has been concentrated in the past.

"In West Africa, Nigerian production has been hit by a combination of attacks on, and damage to, pipelines which took around 750,000 bpd out of supply," says the Petroplan executive. "There is also a degree of regulatory uncertainty in Nigeria, thanks to the passage of the Petroleum Industry Bill. Once the industry picks up in South Africa, and more jobs are on offer, skilled workers in West Africa are likely to vote with their feet."

Then there are emerging areas in eastern Africa, with countries such as Uganda and Kenya seeking to exploit oil reserves, and Tanzania and Mozambique keen to monetise new-found gas riches offshore.

"The upstream industry in East Africa (Tanzania, Kenya and Mozambique) is still at a nascent stage, with exploration taking place and fields (predominantly gas) having been identified, but not moved into production as the current oil price is too low," says the Petroplan executive. "If the oil price reaches and remains above a level of US$60 per barrel, we should see recruitment begin to pick up in the region."

> **"There is downstream scope in South Africa, and upstream opportunities will follow midstream and downstream activity in the gas economy "**

MENTAL HEALTHCARE FOR OIL AND GAS EMPLOYEES

While oil and gas operations become physically safer workplaces, the mental health of employees may not be a high priority. Dr Steve Smith, senior lecturer in mental health and wellbeing at Robert Gordon University, advises on how operators can be more effective in this area.

WE HAVE ERADICATED, or controlled, almost all the risk factors in oil and gas exploration and retrieval; the biggest risk factor we have left is to not respond to issues of mental health and wellbeing across the industry. Different people respond in different ways but, generally, being separated from loved ones has a negative impact on psychological wellbeing.

What is more harmful though is the changing pattern of 'being' in the family. Offshore workers have to change their way of living according to their rota, and this lack of constancy is stress provoking for many. This is the cause of 'counting down' days until the end of one period offshore (and the heightened stress that comes if that departure is delayed) and the same experience before going back offshore. Constantly dealing with change is very stressful.

We can only operate at optimal levels under pressure for relatively short periods of time, then our ability to concentrate begins to diminish. We become more easily distracted it and takes more effort to maintain focus. This depletes our physical and psychological reserves, leaving us less able to respond to everyday demands, building up underlying levels of stress.

Research suggests that offshore workers have higher levels of stress than onshore colleagues, and that this exhibits itself in feelings of being constantly under strain. This is hardly surprising, but it's important to recognise that, just as we might go to the gym to keep physically fit, we can also develop and maintain psychological resilience. Activities based around mindfulness-based stress management, can help us respond more functionally to the stress of offshore working.

Almost any operation in a remote area is, by definition, risky. Workers are well trained in recognising and dealing with dangerous environments; however, we see what we look for, and this means that remote workers can develop a cognitive bias towards perceiving danger around them, including time when they are out of the high risk environments in which they work. In other words, we come to see danger, or risk, everywhere; and that is extremely stressful. While the industry has to maintain and develop extremely high levels of vigilance, we have to find ways of helping people refocus and retune their 'risk radar' when they are back in the 'normal' world. Otherwise, what we can be left with is a general state of free floating anxiety – a feeling of marked unease, but without an obvious cause to relate it to.

Mental health issues should be taken seriously by operators.

It is still seen by many, particularly in the current economic environment and in male-dominated industries, that admitting feeling low, or stressed, is a weakness which should be avoided. Thus, it's important to promote these issues; pretending that they're not there damages the entire industry.

In Britain, for example, stress-related illness is the most common reason for people to be absent from work. Therefore, we can assume that between a third and a half of the offshore workforce are working at a sub-optimal level due to stress. No opeator would accept a situation where 50 per cent of valves, or pipes were unable to work at full capacity because they weren't properly maintained. That's why, particularly in the current climate, we need a culture shift; a shift to a culture in which the "toughest" recognise they have to train to stay on top, and the need to train emotionally and psychologically is greater than the need to train physically.

I hear from people that a lot of the younger guys working offshore are more open to ideas like yoga and mindfulness, and promoting mental wellbeing, but as a culture we need the lead to come from a senior level, to promote mental health and wellbeing not only as a way of helping their workers stay healthy, but as a way of properly maintaining their most expensive and sophisticated assets.

A "BUYER'S MARKET" TIPPED FOR 2017 WITH MERGERS AND ACQUISITIONS

With 2017 starting with news of Shell selling its stake in Vivo Energy to Vitol Africa for US$250 mn, will the new year be one of lively M&A activity across the African oil and gas industry? asks *Oil Review Africa* editor Georgia Lewis.

THE FIRST BIG African oil deal for the year came with the January announcement that Shell had signed an agreement with Vitol Africa to sell its 20 per cent shareholding in Vivo Energy for US$250mn. The sale is part of Shell's strategy to focus on downstream operations and Vitol will benefit from the transaction's clause that a long-term branding licence agreement will be renewed to keep the well-known Shell branding visible across the continent.

Could this be the start of a busy year of deal-making for Africa's oil and gas industry? According to Reuters, top oil companies are "back in acquisition mode, targeting smaller exploration and development firms to boost oil and gas reserves rather than the mega-mergers that followed previous slumps in crude prices".

> **"BP announced a US$1bn partnership with Kosmos in Mauritania and Senegal and bought a 10 per cent stake in the Zohr gas field"**

Image Credit: Shell

Shell has been involved in one of the first big African oil and gas deals for 2017 with the sale of its Vivo Energy stake to Vitol.

Globally, major oil companies announced 11 deals worth more than US$500mn since the end of November 2016. Within Africa, BP was busy towards the end of 2016, announcing a US$1bn partnership with Kosmos Energy in Mauritania and Senegal, as well as buying a 10 per cent stake in Eni's Zohr gas field in Egypt for US$375mn. Additionally, Rosneft, the Russian-based majority-government-owned oil company, purchased a 30 per cent stake in the Zohr field for US$1.575bn.

"The international [ex-US] asset market is a buyer's market, as sellers continue in balance sheet preservation mode," Charles Whall, energy portfolio manager at Investec Asset Management told Reuters. "European majors, which already have large dividend commitments, are unwilling to use equity for assets without immediate cashflow."

Strong interest in alternative energy in Africa may impact on oil and gas deal activity, or encourage companies to diversify. French giant Engie has announced its collaboration with Morocco's Nereva Holding to invest in renewable capacity in north and west Africa.

It remains to be seen how the development of the African Union and trade deals, such as the Economic Partnership Agreement (EPA) between the European Union and Botswana, Lesotho, Namibia, South Africa and Swaziland, will impact on M&A activity on the continent in 2017. Mozambique is also in the process of ratifying the EPA. The EPA will give Botswana, Lesotho, Namibia and Swaziland immediate, duty-free, quota-free access for exports to the EU, while South Africa will enjoy enhanced market access beyond the existing bilateral agreement.

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WELL CONTROL TO BOOST AFRICA'S MPD MARKET

Managed pressure drilling (MPD) services are only provided by a few suppliers but it is a fast-growing market thanks to the important role it can play in well control and risk reduction. Nnamdi Anyadike reports.

EVER SINCE THE 2010 Gulf of Mexico BP well blowout, the issue of oil well control has become of pivotal concern to the global hydrocarbon industry. Oil well control is the management of the effects that can be caused by the unexpected release into the atmosphere of natural gas and/or crude oil. These releases are so dangerous because they can cause blowouts that can in turn result in a fire. Offshore, these risks are being reduced by methods such as managed pressure drilling (MPD). More than three-quarters of global MPD services are supplied by just a handful of the major international oil service companies, namely Schlumberger, Halliburton, Archer Well Services, Weatherford International and Baker Hughes.

The MPD market is fast growing. A recent report forecasts growth rising from \$3.81bn in 2016 to \$4.60bn in 2021. And although this growth is taking place across all geographical regions, it is offshore Africa – whose growth rate has now overtaken North America – that the report says will become "the fastest-growing within the MPD services market." This is due to the recent discoveries occurring offshore in countries such as Angola, Tanzania and Mozambique. Along with these discoveries has come an increased pressure on drillers, oil service companies and African governments alike to ensure that proper safety standards at the wellhead are adhered to in line with those adopted in the US and elsewhere. The US Bureau of Safety and Environmental Enforcement (BSEE) recently released its final offshore well control regulations. It builds upon the findings and recommendations concerning the root causes of the 2011 incident.

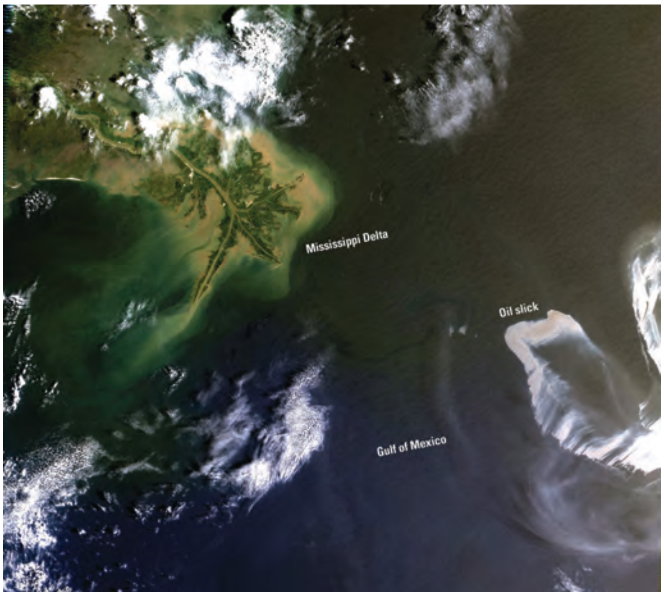

Image Credit: NASA Goddard Space Flight Center/Flickr

The Gulf of Mexico disaster of 2010 has led to an industry-wide re-evaluation of well safety.

The US government claims that the rules will reduce the risk of an offshore blowout. However, the measures have been criticised by the oil industry. It argues that the prescriptive regulations could impact both offshore worker safety and future offshore energy development. The investigation report by the US Chemical Safety Board (CSB) into the Gulf of Mexico disaster that was released in April 2016 also highlighted the catastrophic failures that took place right across many of the safety-critical systems. It made it clear that if the technological systems that are now being put in place don't have proper safety management and are not aligned from the lowest level to the highest then it is just a matter of time before a similar disaster is repeated elsewhere.

But the consequences of a serious well failure, offshore Africa, could be even more serious for the local environment than was the case in the US. Nigerian energy consultant Kayode Adeoye, points to the problems that can occur when highly deviated and horizontal wells are being drilled offshore. One of the biggest challenges he highlights is radioactive contamination. This is because the Bottom Hole Assembly (BHA) often includes a 'logging while drilling tool' that incorporates a radioactive source for measuring formation porosity and density. The problem is that in cases of a well blowout, these 'radioactive tools' are usually abandoned in situ with the well and buried several thousand feet below sea level. "Offshore and onshore, Nigeria and globally, it is a standard operating problem," he said. According to the Journal of Environmental Sciences, the average number of radioactive sources abandoned in oil wells in Nigeria "is greater than the worldwide average" and the annual risk rate of cancer deaths from abandoned logging sources in these oil wells "is slightly higher than the annual risk rate."

A number of operators have now established African bases to oversee offshore equipment service operations. Subsea Masters, a subsidiary of UK-based GEV Group, has signed a joint venture with Zamakona Shipyard, Las Palmas, Canary Islands to provide rig maintenance and repair for the West African offshore drilling market. The joint venture offers well control equipment maintenance and servicing, including subsea riser management and complimentary services such as tubular and rig inspections. Zamakona Shipyard has worked separately on projects for drilling contractors with rigs moored in the region, such as Transocean.

Meanwhile, earlier this year the Norwegian listed engineering and equipment design service provider, Aker Solutions, and the French oil major Total entered into a four-year collaboration on research and innovation. The collaboration is specifically designed to develop new cost-effective subsea technology for Africa. The two companies have already worked together on deepwater subsea systems, such as those used by Total offshore West Africa on its Angolan Kaombo and Dalia fields and the Moho Nord Field offshore Congo-Brazzaville. The focus areas of the new collaboration will include the further evolution of subsea processing and compression systems to boost the cost efficiency of deepwater gas production and the development of electric subsea controls. It also includes the optimisation of flow measurement technologies. The US oil service company, Halliburton, is also making additional strides in its offshore Africa business. In July 2016, it introduced its Global Rapid Intervention Package (GRIP), a suite of services developed to help reduce costs and deployment time in the event of subsea well control events. The GRIP package features a new high-temperature, 15,000 per square inch (psi) RapidCap air-mobile capping stack. It also incorporates a specially designed gate valve-based system that it says is lighter, less expensive, and more mobile than other options currently on the market. These features make it suitable for Africa's offshore waters.

Angolan offshore operations are benefiting from new technological advances in well control.

Image Credit: jbdodane/Flickr

Not to be left behind, Haliburton's main oil service rival, Schlumberger, has announced new products for the well control sector. These include products such as RHELIANT PLUS. It is also re-engineering its approach towards well control management. Guy Arrington, President of M-I Swaco, a Schlumberger company, said that this involved working more closely with the offshore client. "In Schlumberger, we are integrating the design of the downhole system – the fluids, the BHA and the software to run that entire system - as opposed to putting together individually designed components." He believes that early engagement and integrated solutions can help operators achieve a 20-30 per cent reduction in costs in deepwater. "Technology and reliability in deepwater are key to achieve further cost reductions.

For example, on a HPHT deepwater well in West Africa, an operator was looking for a drilling fluid system that would maintain flat rheology while achieving exceptional hole cleaning. We selected our next generation RHELIANT PLUS drilling fluid system, which answered these challenges."

However, the oil industry still has much to learn from other industries. Arrington said that for the performance of oil field equipment to be able to match the level at which the automotive industry operates, current failure rates would need to be decreased by "as much as 96 per cent." The possibilities for improvement though certainly exist. The Oil & Gas Innovation Center in California says it has identified nearly 350 crossover technologies worth between $2bn and $3bn that are either commercialised, "or on the cusp of being commercialised," that have potential applications in the oil and gas sector. Examples include a recent development in equipment that can operate in a high-temperature environment; carbon nanotubes; and a new vibration-resistant fastener. This fastener was originally developed for spinal implants and it has since been put to use in the aerospace industry. The Innovation Center believes that it can readily be brought into the oil industry for high-vibration applications.

The low oil price has meant that over the past two years most oil company resources have been dedicated to mending ailing balance sheets rather than developing new well control technologies. Yet investment in these new technologies and systems is the key to future prosperity. At a recent oil industry conference Debbie McIntosh, head of subsurface and wells for UK-based OTM Consulting said that the industry doesn't have time to waste. "We have to start looking at accelerating technology programmes to meet the requirements we will have in 10 years' time," she said. An OTM survey conducted in late summer showed that nearly 80 per cent of the 50 or so players that were petitioned believed that the current level of investment will not meet future requirements.

This is going to have a significant effect on Africa's oil and gas industry, which is dealing with increasing complexity amid volatile oil prices and fast-paced market changes. The International Association of Drilling Contractors says that in addition to the challenges unique to Africa, pressure on drilling industry performance with regards to operating in ultra-deepwater, sub-salt, HPHT, re-entry drilling for gas redevelopment and managed pressure operations is bound to intensify.

The big question is how best can the industry rise to meet these challenges while still embracing the fresh opportunities from onshore to ultra-deepwater?

DRIVING SUSTAINABLE DEVELOPMENT OF NIGERIAN OIL AND GAS

Leaders in oil and gas from across Africa, as well as international speakers and delegates, will meet in Lagos at the end of February in an event that promises to focus on promoting sustainable development in the Nigerian petroleum sector.

THE INAUGURAL WEST African International Petroleum Exhibition and Conference (WAIPEC) taking place 21-23 February 2017 at the Eko Convention Centre, Lagos, Nigeria, aims to play a leading role in promoting and driving sustainable development of Nigeria's petroleum industry.

The event will be hosted by the Petroleum Technology Association of Nigeria (PETAN) and will promote Nigerian expertise and major West African projects, while supporting the development of major new collaborations for the benefit of the region's petroleum economy.

The three-day event will host more than 25 business, technical and special focus sessions, and 75 industry speakers and representatives from the regional and international oil and gas community. An exhibition projected to attract more than 200 exhibitors and 6,000 visiting professionals from West Africa, Europe, America and Asia will run alongside the conference.


Image Credit: Shutterstock

The conference will bring together important stakeholders from the Nigerian petroleum industry.

> "WAIPEC has been created to specifically address Nigeria's national energy needs, highlight challenges and promote continued development"

Bank Anthony Okoroafor, Chairman of PETAN said, "WAIPEC has been created to specifically address Nigeria's national energy needs, highlight its challenges and importantly, promote its continued development. The event will provide a platform for the many major oil producers, engineering companies, oilfield services and consultants operating in Nigeria and West Africa, to showcase their technologies and expertise, as well as work to attract international investment and create partnerships for the betterment of the sector."

WAIPEC recently announced the steering committee that will drive the programme. The 10-member committee represents a cross section of key senior business leaders and stakeholders from across Nigeria's oil and gas sector, including senior NNP, SNEPCo, TOTAL E and P, First E and P and SEPLAT officials.

Okoroafor explained, "PETAN has put together an esteemed panel of representative from both public and private exploration, production and services companies – their expertise together ensures a programme that presents an invaluable insight for all stakeholders and participants in WAIPEC 2017."

According to the organisers, WAIPEC is the only oil and gas event to be held fully in partnership with Nigeria's petroleum industry and the 10 committee members, alongside PETAN, will draw on their unrivalled global resources to ensure that the event delivers to the needs of all stakeholders in Nigeria and through the region.

AFRICA DIALS UP NEXT-GENERATION SURVEYS

African operators are keeping up with the latest advances in airborne survey technology, which is essential when seeking out opportunities in some of the world's most remote and difficult terrain. Martin Clark reports.

AIRBORNE SURVEYS HAVE long played a role in mapping out Africa's oil and gas industry, especially in remote areas or difficult terrain. Long before drillers struck oil in Uganda, airborne surveys were feeding data to geologists providing vital clues as to where to concentrate their search.

With drilling a single well worth potentially millions of dollars, the costs of airborne surveys, typically using light aircraft with a hatch allowing the use of a variety of sensors (hyper spectral cameras, photo cameras, light detection and ranging [LIDAR]) are fully validated. Local players include the likes of Spectrem Air of South Africa – a member of the International Airborne Geophysics Safety Association – which has pioneered significant advances in airborne electromagnetic technology since its original development 35 years ago.

As a branch of the aviation industry, safety is naturally paramount, just as it is in other strands of the oil and gas sector. International firms such as Bell Geospace have likewise conducted multiple surveys across large swathes of Africa, targeting other sectors too such as water and mining. In the oil and gas industry, that includes mapping some of Kenya's little-explored territory, which has only recently yielded huge promise after a series of new discoveries by drillers.

Elsewhere, it has covered Ethiopia, and much of southern Africa, including Botswana and South Africa, among other locations. The company can

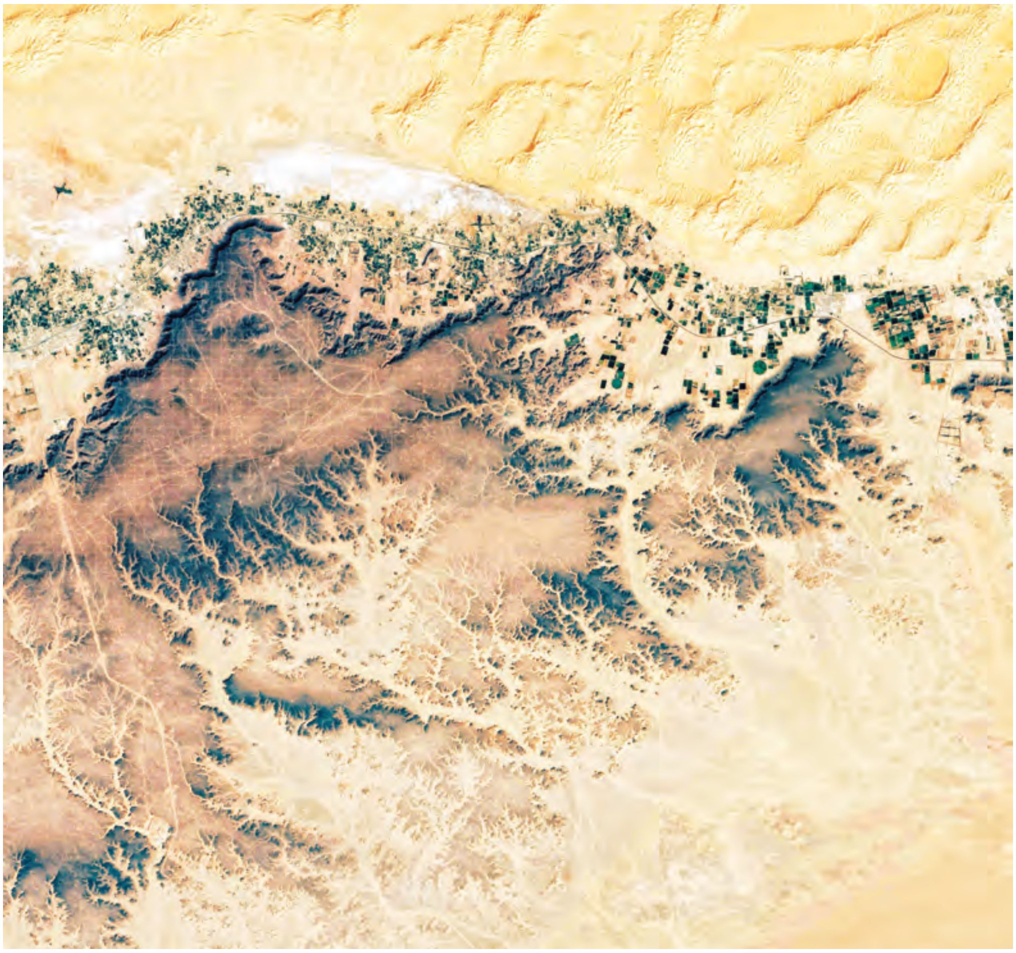

Image Credit: Stuart Rankin/Flickr

Aerial seismic sueveys, such as this one taken over Libya, can reveal oil deposits without environmental damage.

> "With the drilling of wells potentially costing millions of dollars, the costs of airborne surveys, typically using light aircraft with a hatch allowing the use of sensors, are fully validated"

Offshore Durban has been identifed by airborne survey as an area of great hydrocarbon potential.

Image Credit: Ash Crestfelt/Flickr

provide surveys in a range of resolutions to measure gravity in 3D through a number of steps, says Bell Geospace executive vice president, John Macfarlane. Its latest contract, for 3-D Full Tensor Gradiometry (FTG) data acquisition, processing and interpretative services, covers a vast 198,900 sq km area. FTG data is used by oil companies to plan cost-effective seismic and model sub-surface geology to help find hydrocarbons. Macfarlane says the use of such data can facilitate "a rapid selection of areas of interest for bidding and for planning for subsequent seismic acquisition and interpretation work" among oil companies.

While specially kitted out light aircraft have historically provided this high value data, the advance of drone technology has implications for the sector, not only upstream, but downstream too. This is already being seen in the inspection of lengthy pipelines and other field infrastructure, such as communications sites. South Africa's SGS, a leading provider of testing and measurement services to the industry, says drones can now fly further, for longer, and are capable of reaching the most inaccessible of areas.

Its own new generation drones are currently deployed locally in the farming sector for imaging and data collection, though the potential exists for applications in the energy industry too. High-spec drones can fly up to 29 knots and can be fitted with sensors such as HD video, HD still, thermal cameras, airborne gas sensing and laser measurement equipment, the company says.

Malawi is an interesting case in point when it comes to levereaging airborne surveys for positive results. The country's nascent attempts at oil exploration, particularly in the Lake Malawi National Park region, have not been without controversy, particularly in regard to environmental campaigners concerned about the impact of oil development in the developing country. (See our cover story on corporate social responsibility on page 16 for more information) But airborne surveys are expected to play an important role in the exploration phase of Malawian oil exploration because of their low environmental impact. Thick sedimentary rock formations under Lake Malawi, the Lower Shire Valley and the Vwaza Marshes/Lake Kazuni are all targets for exploration.

Airborne exploration is not new to Malawi, however, with UNDP-funded airborne geophysical surveys taking place over the country between 1970 and 1971 and again in 1984 and 1985.

More recently, Hamra Oil, which acquired the exploration licences for blocks 2 and 3 from UK company Surestream Petroleum, executed an airborne gravity, magnetic and full tensor gravity survey. This indicated that hydrocarbons may be present in the area, including Usisya, which is the deepest part of Lake Malawi. However, Hamra's exploration has been limited because of a border dispute with Tanzania. Other companies have also undertaken airborne surveys in the area and are hopeful that progress can be made on further exploration based on the positive results that have been reported.

Data gained from airborne surveys in Malawi has also helped confirmed the country as a serious future mining destination. Again, environmental campaigners will be watching developments in this arena with interest, as will oil operators. Mkango Resources has accessed airborne data funded by the World Bank in relation to rare earth deposits.

South Africa is another emerging oil market where airborne surveys been effective. Last year, CGG undertook a four-month, multi-client airborne gravity and magnetic survey over offshore South Africa. The Petroleum Agency of South Africa (PetroSA) authorised the programme that extended across two blocks, covering a total of approximately 78,000 line kilometres.

The surveys were undertaken over Cape Agulhas (West Bredasdorp area) and offshore Durban (Eastern Margin area). The Zululand basin, another underexplored area, was also partly covered by the survey.

AFRICA AND THE QUEST FOR EOR INNOVATION

As some Africa operators work with ageing infrastructure while others have to maximise returns from complex plays, the need for enhanced oil recovery innovations has never been greater.

SOME OF WEST Africa's onshore infrastructure dates back more than half a century. As production slips from mature fields, and as producers tap ever more complex reservoir systems, the call for enhanced oil recovery (EOR) to lift – or just maintain – output grows more apparent.

While the region may, in some ways, lag behind other oil-producing areas of the world, such as the US or the Middle East Gulf – which have proved testing grounds for the latest EOR technologies - it still has access to the same pool of technicians, talent and engineers. Major players in the field include major service providers such as Baker Hughes, Schlumberger and Halliburton, all with an extensive footprint across the Africa continent and beyond.

And yet whether the very latest technologies are evident in west Africa is uncertain. However, that could shift, given a projected surge in activity.

A Frost & Sullivan report suggests the global EOR market will triple by 2020.

Advanced techniques such as chemical and thermal EOR are now being deployed in oil projects around the world, while gas injection is relatively commonplace in Africa to elevate or sustain production levels. Many new techniques are being pioneered far away, however, the likes of steam flood technology in the oil-producing deserts of Oman, for instance.

Image Credit: Shell/Flickr

Enhanced oil recovery techniques in use in Oman, a long-term testing site for such innovations.

The Frost & Sullivan report further anticipates that the use of carbon dioxide EOR will become more prevalent than either chemical or thermal EOR in the coming years as host nations focus on carbon capture and sequestration. This is likely to be a trend pioneered not in Africa but, again, in more developed producing territories such as North America and Europe.

Furthermore, the EOR techniques that prove to be most effective in unconventional reservoirs may also differ greatly from those used in conventional reservoirs, say experts at Core Laboratories, a specialist provider of reservoir management and optimisation solutions. This is again a trend likely to shape EOR roll-out in more developed geographies further ahead in the exploitation of unconventional deposits.

Core Laboratories, an EOR innovator itself, is currently working on a number of fluid behaviour and oil characterisation studies in west Africa, including an analysis of a "potential giant field discovery" offshore. What's clear in this domain is that no one size fits all, given the uniqueness of each oil field and the local geology. Also apparent is that the market is poised to expand, with petroleum engineers tasked with developing new strategies for recovery beyond, as part of the never-ending quest to improve field life economics. Though Africa may not always be the test bed for such innovation, it stands to benefit from any new advances.

> **"While other oil-producing regions of the world have proven EOR testing grounds, Africa still has access to the same pool of talent"**

Case study: AGR enhanced oil recovery with Norway-Sudan cooperation

AGR was assigned to provide technical recommendation for pilots, assess the economics, uncertainty and risk analysis of Heglig field to ensure the development of more efficient oil recovery techniques that would be technically, economically and environmentally more viable. AGR experts Gudmund Olsen, engineering manager in Oslo, and Marthe Åsnes Birkeland, Reservoir Engineer, discuss why multidiscipline interaction and local skills development was critical in proving the analytical performance of various scenarios for more advanced chemical EOR in Sudan, enabling future sustainability of the much-required Sudanese petroleum industry.

Following secession in 2011, Sudan's hydrocarbon production reduced from approximately 450 000 barrels per day to 100 000 barrels per day, rendering the Sudanese production status from a substantial oil exporter to a nation just self-sufficient in petroleum. Sudan is currently producing about 250,000 barrels per day.

As part of Norway's commitment to the implementation of the Comprehensive Peace Agreement 2005, the Oil for Development (OfD) programme provides foreign assistance focusing on petroleum policy including legal and institutional framework, resource and HSE management. The EOR activity in Sudan was administrated by the Norwegian Petroleum Directorate (NPD) on behalf of OfD. International Petroleum Associates Norway (IPAN) was contracted to be technical advisors of OfD (NPD) and AGR were sub-contracted to IPAN to perform the technical studies and training, concentrating on best methodology for the Enhanced Oil Recovery of Heglig oilfield. Heglig oilfield, situated within northwest-southeast trending Muglad Basin (southwest Sudan) is part of the Central African Rift System. Three phases of rifting occurred between cretaceous and tertiary, resulting in deposition of a long stretch of sediments in this basin. Commercial hydrocarbons are sourced from the Aradeiba Main, Bentiu 1, Bentiu 2 and Bentiu 3. Heglig boasts much of Sudan's proven oil reserves.

Heglig oilfield was first developed in 1996 by Arakis Energy (now part of Talisman Energy), today operated by the Greater Nile Petroleum Operating Company (GNPOC) reportedly peaked production in 2006. Heglig oilfield is connected to Khartoum and Port Sudan via the Greater Nile Oil Pipeline.

Based on sector model screening, it was decided that the EOR actions to be incorporated to the full field model were: Horizontal producers in Aradeiba F/Bentiu 1 and Polymer Injection in Aradeiba Main and Aradeiba F/Bentiu 1.

New infill wells within reservoirs - Aradeiba F/Bentiu 1 – require a specific length to obtain an adequate initial productivity and sufficient reservoir contact. Simulations including inflow control device (ICD) completion giving a small increase to the overall recovery. Horizontal wells will also reduce the water conning from the underlying aquifer. The risks pertaining to horizontal drilling was a combination of more directional well placement and associated expenses in comparison to vertical wells, which require more thorough planning.

This method is expected to enhance oil recovery by improving the unfavorable mobility ratio for water displacement. The EOR potential is dependent on the polymer viscosity; 12 cp based on lab data is considered a highly optimistic case, whilst 1cp is considered to be the most realistic case due to polymer break down and degradation.

Polymers are sensitive to high temperature and high salt concentration. The temperature and connate water, which proved to be fresh, should not be problematic for the shallowest reservoirs of Heglig reservoirs.

Surfactants were also considered as a combination with polymer injection. The aim of surfactants is to reduce the residual oil saturation in water swept zones, thus the premise for surfactant injection is high residual oil saturation. The residual oil saturation in the water swept zones of Heglig is unknown. A program for *in-situ* measurement is recommended.

Risks with chemical injection include back production in the aspects of facilities, water handling, and polymer degradation during injection that may decrease the desired viscosity.

All cases were constrained by a stepwise decline in total field liquid rate which was similar in all simulation cases and based on the reference case. In the current plan for Heglig in 2014, two new water injectors in Aradeiba Main were planned for pressure maintenance.

The assignments resulted in recommendation for further planning of the selected Pilot(s). Recommended work prior to the Front-End Engineering Design (FEED) phase evolved from the study:

- Re-process seismic to improve frequency content
- Interpret shallow events to see if they can explain features in depth Implement G&G and petrophysical work in field static model for a detailed geological analysis of pilot area(s)

> **“ Advanced chemical EOR in Sudan wil enable future sustainability for the country's much-required petroleum industry ”**

- G&G input to history matching

In regard reservoir engineering: - Take fluid samples analysis for viscosity and asphaltene content.

- Analysis of final results from core experiments and update simulation model.

With regard to well planning, a multidisciplinary effort is needed:

- Detailed geological evaluation of selected area.
- Well design and borehole stability study.
- Risk and contingency planning. Pilot design and detailed planning.
- Design pilot facilities (front-end engineering design)
- Impact assessments: Production facilities and environmental.
- Plan infrastructure and logistics.

Training for much required sustainability is also essential. The OfD project of Heglig oilfield EOR study was challenging on many levels due to restriction of available complete data set and history of the field. The multi-discipline interaction was critical to the overall study, integrating knowledge and information: investigating the three main scenarios, from reference case of current plan, to action of infill horizontal wells, to more advanced chemical EOR by polymer injection, and combination of the two.

The Heglig oilfield study also conveyed the importance of providing knowledge transfer in the form of training the Sudanese geoscientists and engineers to enable future sustainability of the much-required Sudanese petroleum industry. ♦

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AFRICAN RIG COUNT

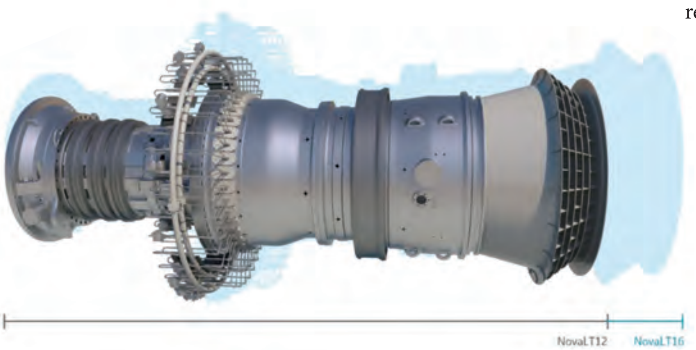
COUNTRY	November 2015	December 2015	November 2016	December 2016
ALGERIA	48	49	53	52
ANGOLA	9	11	3	4
BENIN	1	2	0	0
CAMEROON	1	1	0	1
CHAD	3	3	3	0
CONGO (BRAZZAVILLE)	2	2	0	0
CONGO (DRC)	0	0	0	0
CÔTE D'IVORE	1	1	1	1
EGYPT	49	50	41	41
EQUATORIAL GUINEA	1	0	1	1
GABON	3	2	0	0
GHANA	11	11	10	11
KENYA	9	8	5	4
LIBERIA	0	0	2	2
LIBYA	1	1	1	1
MAURITANIA	1	1	0	0
MOZAMBIQUE	1	1	1	1
NAMIBIA	0	0	0	0
NIGERIA	9	8	5	4
SENEGAL	0	0	0	0
SIERRA LEONE	0	0	0	0
SOUTH AFRICA	1	1	0	0
TUNISIA	0	0	2	2
TANZANIA	0	0	0	0
UGANDA	0	0	0	0
Grand Total	**151**	**152**	**128**	**125**

GE Oil & Gas launch new gas turbines at Florence meeting

GE OIL & Gas introduced two new technologies at the company's 2017 annual meeting, in Florence, Italy.

The super-efficient gas turbines LM9000 and NovaLT12 are examples of how the downturn has driven focus on flexibility, efficiency and productivity, as well as demonstrated the advantages of cross-industry collaboration.

The LM9000 is a 65MW, 43 per cent simple cycle efficiency Aeroderivative Gas Turbine, derived from the proven GE90 jet engine fitted on Boeing 777. The LM9000 delivers 50% longer maintenance interval, 20 per cent more power and 40 per cent lower NOx emissions, resulting in 20 per cent lower cost of ownership for LNG customers. In addition to LNG applications in off and onshore, it can also be utilised for simple cycle, cogeneration and combined cycle power generation.



GE's new gas turbines are the result of cross-industry collaboration.

The NovaLT12, meanwhile, is efficient, flexible, modular turbine designed for high efficiency and low total cost of ownership. It was developed with a special focus on oil and gas midstream operations and is well suited to a wide range of upstream and downstream applications.

Seabed geosolutions mobilises in West Africa

SEABED GEOSOLUTIONS HAS been awarded a 4D baseline ocean bottom node project in West Africa, with a project duration of six weeks.

The crew is in the mobilisation phase of the project, which will support the optimisation of the recovery rate during the development and production phases of oil and gas fields, by providing high quality data on hydrocarbon prospects, reservoir characteristics and potential geohazards. The project positions the company well to respond to other potential projects in the region.

Manta, its node solution is a state-of-the-art system which represents a step change in seabed survey productivity in all configurations and water depths.

Manta was developed in co-operation with Fugro and combines technologies to provide a cost-effective alternative to high-end streamer data acquisition. The system leverages proprietary node technology, fully automated handling systems and innovative deployment methods, resulting in highly efficient operations in all survey configurations up to 3,000 metres.

Stephan Midenet, Seabed Geosolutions' CEO, said, "We are excited to announce the availability of the world's most flexible and efficient ocean bottom node crew. We continue to see a strong demand for high quality seabed seismic data, provided it can be acquired in a significantly more efficient manner. Manta addresses this efficiency requirement, opening avenues for increased use of seabed technologies."

Tyco launches new gas and flame detector after stringent safety assessments

Tyco's DG-TT7-S H2S gas detector with metal oxide semiconductor (MOS) sensor underwent stringent functional safety assessments by an external certification body and is now SIL 2 approved.

The DG-TT7-S is solid-state metal oxide semiconductor gas detectors used mainly for the detection of hydrogen sulphide (H2S) in arid locations where ther is air present, or in locations with a continuous H2S background.

The device's sensor specifies a wider continuous operating temperature range than standard electrochemical sensors up to temperatures of 65 °C and above.

The device supports HART 7 protocol option for full configuration and diagnostics over non-proprietary interface.

Additionally, the MultiTox DG-TT7-S features onboard relays, plug and play sensors and a high-visibility display that changes colour depending on the status mode.

Image Credit: Tyco

This detector is designed for a wide range of challenging conditions.

GlassPoint tells conference about how solar energy can benefit oil producers

GLASSPOINT SOLAR, SHOWCASED its solar technology that generates steam for heavy oil production at the SPE Heavy Oil Conference and Exhibition in Kuwait in December 2016. Like African oil producers, Kuwait's abundant heavy oil resources are integral to achieving the country's oil sector strategy. The leading method of producing heavy oil is steam flooding, a type of thermal Enhanced Oil Recovery (EOR) where heat is used to facilitate production of the viscous oil.

Image Credit: Tambako the Jaguar/Flilckr

Harnessing the power of the sun could prove to be a boon to African oil producers.

In Kuwait, steam flooding projects will burn large volumes of imported natural gas or other costly fuels to produce steam, which will compromise export revenues.

GlassPoint's solar EOR technology uses the sun's energy to generate steam, reducing EOR gas consumption by up to 80 per cent.

"Using solar at large scale in the oilfield will help Kuwait greatly reduce its total reliance on imported gas," said Hussain Shehab. GlassPoint's Kuwait country chairman. "The deployment of solar EOR in Kuwait is both an environmental and strategic decision for the future of the oil and gas industry and the economy."

AVEVA and Microsoft deliver new technology workshops for oil and gas leaders

AVEVA AND MICROSOFT will deliver a series of workshops at the Microsoft Technology Centre in Dubai, showing how software can power operational excellence through collaborative 3D visualisation. Microsoft's new Middle East and Africa centre of excellence for Oil and Gas in Dubai, drives digital transformation for the industry, a one-of-its-kind facility globally. The centre helps companies in the sector take advantage of the latest trends such as the Internet of Things (IoT), advanced analytics, modern productivity and cloud computing.

"Digital transformation is top of mind for executives in the oil and gas industry, which is why this centre of excellence was built," said Omar Saleh, director for Oil and Gas at Microsoft, Middle East and Africa. "With AVEVA, we provide our customers with specialist knowledge and access to solutions that enable the creation of some of the world's most complex oil and gas plants, vessels and offshore facilities."

Workshop attendees can see how AVEVA ENGAGE puts immediate access to information at their fingertips. It connects engineering documents, models and data to an ultra-high definition 3D visualisation of an asset on Microsoft Surface Hub, a powerful team collaboration device designed to advance the way people work together.

Image Credit: AVEVA

Dubai workshops are set to benefit leaders in the Middle East and beyond.

Maximising pump efficiency through reduced corrosion and erosion: Sulzer

INDUSTRIAL PROCESSES ACROSS the globe require pumps to operate reliably and efficiently, according to Sulzer. For applications where the use of carbon steel or cast iron is preferred due to cost reasons, the corrosion rate can be estimated very accurately. Polymeric coatings like Fusion Bonded Epoxy can be applied to pump components using a fluidised bed or electrostatic coating. They provide a good level of corrosion protection as long as the coating isn't damaged. As a polymer coating it is limited to low flow conditions and normally used in clean water applications where it may also improve the hydraulic performance by smoothing the pump surfaces.

However, coatings which are appropriate for pipelines may not be suitable for pump applications where the flow velocities are much higher, narrow passages concentrate the flow and moving parts can be difficult to protect.

Again, some methods, such as galvanic protection, are largely unsuitable for pumps.

In these cases coatings are applied to specific areas where increased flow rates are expected or at points where impact damage is expected, such as 90 degree bends.

A hard layer is usually applied using a spray coating method such as Air Plasma Spraying (APS), or High Velocity Oxygen Fuel (HVOF).

Sulzer advises on the latest methods to prevent corrosion and erosion.

Volvo Penta's engines for marine op hoists

VOLVO PENTA IS supplying 5-litre engines to CIMOLAI Technology for a new marine hoist. The engines' power enables the machine to raise boats weighing up to 560 tons out of the water, for maintenance and dry-dock transportation.

Volvo Penta and its industrial products dealer, Carmi, are working with Italian manufacturer, CIMOLAI Technology to supply twin TAD571VE engines for a new travel lift. The MBH 560 is a mobile unit that enables marinas to hoist large boats in or out of the water, for launching, repairs and maintenance. It has already proven to be a success during testing when it lifted a 550-ton boat which had previously failed to be raised by a similar machine at a port in Turkey.

"As a Volvo Penta dealer, we represent a global organisation and our mission is to work in close quarters with the customer in order to achieve symbiosis between machine and engine, to reach the best possible performance," says Francesco Girotti, sales and application engineer for industrial engines at Carmi. "With this sort of lifting, once the boat is out of the water the load is applied immediately, so the engine has to give a very rapid response to avoid shutdown. Volvo Penta's five-litre engines performed perfectly in this demanding field test with CIMOLAI's machine, with less than 2 per cent rpm deflection from zero to full load."

Volvo Penta's TAD571VE is a powerful yet economical four-cylinder off-road engine. Running at 175hp offering excellent torque at low rpm.

Brady develops a safe lockout for large gate valves

BRADY HAS DEVELOPED a durable solution to safely lock out gate valves with diameters ranging from 3 inches up to 18 inch. The new Collapsible Gate Valve Lockout also features a tri-folding system for easy storage.

The Collapsible Gate Valve Lockout can block gate valves up to 18 inch to neutralise or secure the flow of energy or materials to machines. Every worker servicing a machine can apply a padlock to the lockout device to lock a gate valve in the off-position during maintenance. This prevents other workers from inadvertently re-energising machinery which could lead to accidents. Collapsible Gate Valve Lockouts can also be used to secure the flow of water to firefighting systems for example. The Collapsible Gate Valve Lockout can easily be rotated around a valve to lock it in the off- or on-position. The device's tri-folding system makes it practical to store or carry, while still being able to cover and lock large, 18 inch valves. With just three size variations to lock a range of valves from 3 to 18 inch, the new lockout solution is also a very flexible and practical tool to reduce accidents.

Image Credit: Brady

This new gate valve can help prevent workplace accidents.

The new Collapsible Gate Valve Lockout is a rugged styrene construction that can withstand harsh outdoor conditions. The device can be coupled with any of Brady's padlocks, available in several materials to suit the needs of specific industries. Up to two padlocks can be attached to the Collapsible Gate Valve Lockout, and more padlocks can be added to safeguard larger maintenance teams by using Brady's Lockout/Tagout safety hasp.

ADVERTISER'S INDEX

MORE RESPONSIBLE OPERATIONS ACROSS AFRICA

Gbenga Onadeko, programme committee co-chair for the SPE/AAPG Africa Energy and Technology Conference, which took place in Kenya, talks to *Oil Review Africa* about the great improvements being made in environmental reponsibility among the continent's operators.

Mr Onadeko says that health, safety and environment issues need to be highly prioritised.

Image Credit: SPE

Do you think operators in Africa have become more environmentally responsible?

Based on my 25 years of experience, operators in Africa have predominantly been in line with expectations with markedly improved environmental responsibility in recent times. The early involvement of major international operators in exploration and development activities helped frame a more environmentally focused perspective, helping operators adhere to global standards.

New finds have occurred in environmentally sensitive areas such as Lake Victoria and Lake Albert in East Africa. Operator companies are involved in taking extra steps to incorporate environmental stewardship in their development plans right from the beginning, diligently taking risk mitigation to new levels The reservoirs in some of those areas are relatively shallow and contingency plans are put in place to protect the environment even if exceptional natural events like earthquakes occur.

In Gabon, drilling activities have been successfully carried out in environmentally sensitive areas using technology which limits the impact.

Discussions concerning the environmental responsibilities of our industry in Africa would not be complete without taking into consideration some of the environmental issues reported in the Niger Delta. Most of the occurrences in recent times have been due to the collateral effect of the social unrests. Despite this, the operators and the government have announced their continued commitment to cleaning and the ongoing protection of the environment.

What role can governments play in ensuring oil and gas operations are more sustainable?

The regulatory authorities must continue the practise of ensuring that environmentally sound principles are incorporated in their approval processes and those guidelines must be kept up to date. Currently, the operators drive this based on their policies, experience and global standards. They have assisted the governments of countries which are just beginning to exploit these resources to develop these guidelines. Some of the new resource enriched countries like Mozambique have taken the extra step of leveraging experiences from countries such as Norway. Another area where the governments can provide leadership is by providing incentives for operators to develop technologies that align the best interests of the country with those of the operator.

An example would be to promote technology development which would reduce the amount of produced water from the reservoir which in turn would reduce the overall infrastructure requirements and disposal issues.

Governments can encourage their tertiary educational institutions to develop specific petroleum engineering curriculum, this will provide the pipeline of future specialists and leaders in the industry.

What role does the private sector have to play?

Most of the oil and gas activities in Africa are driven by the private sector which can source the required funds for investments in large oil and gas development projects. Those companies have extensive experience and guidelines on how to operate in a safe and environmentally sound manner, continuing to be innovative and receptive to ideas that can lead to more sustainable operations. They must exercise discipline and be self-regulated even in the absence of strong environmental policies from their host governments.

As oilfields become more marginal and are taken over by smaller companies, most of them originating from the host countries, those lower cost and hopefully more efficient operators must continue to improve on the practises of the majors and the international independents who handed those fields over to them. This also includes considerations for well and field abandonment which must be built into the design upfront. Despite the current low commodity prices, operators must not lose sight of health, safety and environmental considerations.

Delegates during an OPITO CA-EBS Initial Deployment training session

"In keeping with our tradition of continuous development, we have gone on to get another globally recognized health, safety and risk qualification; we are now an accredited course provider for NEBOSH International General Certificate in Occupational Health and Safety. In so doing, we have radically improved our own systems of work whilst mitigating workplace hazards and further entrenching safety as a culture amongst our staff and customers."

We also offer the following courses at our Training Facility among others:

TBOSIET
HUET/SAS
Basic Fire Fighting & Self Rescue
Basic First Aid & CPR
TFOET
AED
Advanced Fire Fighting
Advanced First Aid
IMIST
STCW 95
PSCRB
COXSWAIN
HLO
Swing Rope
Emergency Response Team Member/
Leader Training
Fork Lift
Over-head & Pedestal Crane Operation
BOSIET
FOET
HUET/CA-EBS

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