Europe €10, Ghana GHc22, Kenya Ksh500, Nigeria N1800, South Africa R60, UK £7, USA $12 WWW.OILREVIEWAFRICA.COM

Oil Review Africa

Oil · Gas · Petrochemicals

VOLUME 13 | ISSUE 5 2018

Southern Africa's deepwater AMBITIONS

Coral: Mozambique's FLNG achievement

The rise of women in African oil and gas

Cryptocurrency and exploration in Namibia

Corrosion management, fire prevention, certification, flow management, artificial lift, warehousing

SEE US AT THE SHOW

25th AOW AFRICA OIL WEEK

Interview: Bode Balogun, Prime Atlantic Global (p48)

A detailed analysis of southern Africa can be found on page 24.

EDITOR'S NOTE

It's Africa Oil Week time once again and *Oil Review Africa* is delighted to renew its partnership for this event. As oil and gas industry leaders descend on Cape Town for a week of discussion, presentations and networking, our economist Moin Siddiqi offers his detailed analysis of oil and gas prospects across the southern part of the African continent. Will deepwater projects prove to be the big winners across multiple markets? See page 24 for more.

Elsewhere in this issue, we catch up with Dr Amy Jadesimi, managing director of Ladol (p34) and flag up the achievements of women in the Nigerian oil and gas industry (p34). The future is bright for women in the industry with more opportunities and more encouragement for girls to study STEM subjects and pursue careers in this traditionally male-dominated field. We look forward to more interviews with leading women in future issues of the magazine.

Georgia Lewis
Managing Editor

Managing Editor: Georgia Lewis
ora@alaincharles.com

Editorial and Design team: Prashanth AP, Hiriyti Bairu, Miriam Brtkova, Praveen CP, Rhonita Patnaik, Samantha Payne, Rahul Puthenveedu, Deblina Roy, Louise Waters

Publisher: Nick Fordham

Sales Director: Michael Ferridge

Magazine Sales Manager: Chidinma Anah
Tel: +44 (0) 20 7834 7676 Fax: +44 (0) 20 7973 0076
E-mail: chidinma.anah@alaincharles.com

International Representatives

India	Tanmay Mishra
Nigeria	Bola Olowo
UAE	Graham Brown
USA	Michael Tomashefsky

Head Office:

Alain Charles Publishing Ltd
University House, 11-13 Lower Grosvenor Place,
London SW1W 0EX, United Kingdom
Tel: +44 (0) 20 7834 7676 Fax: +44 (0) 20 7973 0076

Middle East Regional Office:

Alain Charles Middle East FZ-LLC
Office L2-112, Loft Office 2, Entrance B
P.O. Box 502207, Dubai Media City, UAE
Tel: +971 4 448 9260 Fax: +971 4 448 9261

Production: Srinidhi Chikkars, Nelly Mendes, Infant Prakash, Rakshith Shivakumar
E-mail: production@alaincharles.com

Subscriptions: circulation@alaincharles.com

Chairman: Derek Fordham

Printed by: Buxton Press

 ISSN: 0-9552126-1-8

Alain Charles Publishing
Serving the world of business

CONTENTS

NEWS

6 **African hydrocarbons news**
Updates from across the continent.

COVER STORY

24 **Outlook for Southern Africa**
Emerging and established markets.

COUNTRY FOCUS

28 **Mozambique**
Major FLNG milestones.

30 **Nigeria**
Refinery development update.

32 **South Africa**
Petroleum SA's latest activities.

58 **Namibia**
Pioneering cryptocurrency for oil and gas in an ambitious project.

TECHNOLOGY AND OPERATIONS

36 **Women in oil and gas**
Leading the way in Nigeria.

38 **Rig reactivation**
Getting back into business.

40 **Corrosion management**
Vital maintenance for operators.

42 **Asset optimisation**
Cost-effective FPSO management.

43 **Fire prevention**
Safety in hazardous locations.

45 **Safety**
Improved regulations.

47 **Certification**
Guidelines from Bureau Veritas.

49 **Flow management**
Flow induced vibration assessments.

50 **Compressors**
Powerful new turbo technology.

51 **Artificial lift**
A sector reassessment.

53 **Warehousing**
Leveraging blockchain and an update from Stodec Trading.

INTERVIEWS

34 **Dr Amy Jadesimi**
On her ambitions with Ladol.

48 **Bode Balogun**
Prime Atlantic Global Instruments.

52 **Jude Abalaka**
Tranos managing director.

55 **Paul Alexander**
Storm Procurement managing director.

Executives Calendar 2018-2019

OCTOBER & NOVEMBER

29-30 **Algeria Future Energy**
Algiers
www.algeria-future-energy.com

31 Oct-2 Nov **Mozambique Gas Summit & Exhibition**
Maputo
www.mozambique-gas-summit.com

5-9 **Africa Oil Week**
Cape Town
www.africa-oilweek.com

12-15 **ADIPEC**
Abu Dhabi
www.adipec.com

21-22 **Ghana Summit**
Accra
www.cwcghana.com

22 **Big 5 Board Awards**
London
www.africa-petroleumclub.com

DECEMBER

3-6 **Practical Nigerian Content**
Yenagoa, Nigeria
www.cwcpnc.com

JANUARY 2019

14-17 **World Future Energy Summit**
Abu Dhabi
www.worldfutureenergysummit.com

23-24 **WAIPEC**
Lagos
www.waipec.com

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

Digitalisation focus for oil and gas at ADIPEC 2018

ABU DHABI INTERNATIONAL Petroleum Exhibition and Conference (ADIPEC) will be held from 12-15 November 2018, focusing on the advancement of artificial intelligence, blockchain, robotics, sensor technology, machine learning, deep learning, edge computing etc to drive oil and gas industry.

Digitalisation is a major trend driving CEO decision-making in the global oil and gas sector. A range of interconnected emerging technologies aims to unlock a potential US$50bn in savings and increased profit, according to McKinsey. Digitalisation is expected to cut capital expenditure by 20 per cent, with operating costs in upstream cut three to five per cent and one to three per cent in downstream.

"Digitalisation is an urgent priority for industry CEOs and business leaders, offering cost savings, operational improvements, and safety and environmental gains that will reach into every corner of the business, but the opportunities come with risks that must be understood and navigated," said Jean-Philippe Cossé, vice-president for Energy at dmg events.

"ADIPEC is responding to this with a new 'Digitalisation in Energy zone, supporting innovation, and helping drive smart investments that will be the foundations of business success in the years ahead," Cossé added.

Spanning both exhibition halls and the strategic and technical conference programmes, the Digitalisation in Energy zone will include top technology providers and new start-ups serving the oil and gas sector. A purpose-built Innovation Theatre will provide tech companies with the opportunity to host expert talks and take digitalisation out of the technology silo and place it at the centre of a much bigger conversation.

Conference sessions for the downstream refining and petrochemicals sector, which were introduced for 2017, will return to ensure that ADIPEC covers each link in the oil and gas value chain.

The co-located waterfront Offshore and Marine Exhibition and Conference will add a commercial dive zone, while other returning features include the ADIPEC Awards, which celebrate excellence in energy, and Young ADIPEC, a dedicated 'edutainment' programme designed to encourage students to choose a career in energy.

New for 2018 will be an Inclusion and Diversity in Energy conference programme, continuing and expanding on the work of the Women in Energy conference in previous years.

Hosting more than 80 ministers, CEOs, and global oil and gas business leaders as speakers, ADIPEC brings together the companies, decision and policy makers that shape the future of oil and gas supply, for four days of focused business, dialogue and knowledge transfer that addresses today's energy challenges and defines tomorrow's hydrocarbon landscape.

The technical conference programme, organised in collaboration with the Society of Petroleum Engineers (SPE), sets the international standard for the exchange of best-practice and operational excellence in the world of energy, with all technical abstract submissions put through a rigorous evaluation process by the Technical Programme Committee. Sessions cover upstream, midstream and downstream sectors, including offshore and marine.

www.adipec.com

Madagascar government to launch bidding round at Africa Oil Week 2018

OMNIS, IN PARTNERSHIP with Africa Oil Week, TGS and BGP, will launch a licensing round during the Africa Oil Week conference, which runs from 5-9 November 2018.

Paul Sinclair, conference director, said, "On top of the 15 confirmed ministers who will lead delegations to Africa Oil Week, we now have a partnership with the government of Madagascar, TGS and BGP to host what is clearly one of the most exciting rounds on the continent since Côte d`Ivoire bidding round in 2017."

Will Madagascar be the next big African offshore market?

"With the aim of intensifying offshore exploration activities, we are delighted to announce that OMNIS will be inviting investment from interested parties, during a licensing round to start in November 2018. We are working together with TGS and BGP to create an attractive environment for exploration in the offshore," Voahangy Nirina Radarson, general manager of OMNIS commented.

www.africa-oilweek.com

Eni, BP and NOC to explore in Libya

ENI HAS ACQUIRED 42.5 per cent stake and become operator of three of BP's Libyan oil exploration areas to restart exploration activities and fast-track to production.

National Oil Corporation (NOC) chairman Mustafa Sanalla, BP group chief executive Bob Dudley, and Eni CEO Claudio Descalzi signed a Letter of Intent (LOI) in London. The LOI boosts the parties' commitment to social impact initiatives, including education and technical training.

NipeX
Nigerian Petroleum Exchange
• Fast • Efficient • Transparent

Our Brand Attributes

NipeX: AN E-PROCUREMENT ONE STOP SOLUTION

Want to do business in the upstream sector of the Nigerian Oil and Gas industry? You need to register with Nigerian Petroleum Exchange (NipeX).

NipeX is an Electronic Tender Processing Platform with a comprehensive Supplier Database, from where buyers in the industry source suppliers to attend to their high profile tenders.

We increase visibility of suppliers for business opportunities, as well as instill integrity into the contracting process.

NipeX OPERATIONS

The NipeX system consists of two complementary web-based applications that facilitate supplier selection and contract approval processes, namely the Joint Qualification System (JQS) and Electronic Marketplace (eMarketplace). JQS is an online supplier database which provides a standardized and transparent means of pre-qualifying suppliers registered in Nigeria for opportunities in the industry. The E-Marketplace is an online platform designed to facilitate contract processing between operators in the upstream sector and the Nigerian National Petroleum Corporation.

NipeX RENDERS THE FOLLOWING SERVICES TO THE OIL AND GAS INDUSTRY AND BEYOND:

- Supplier Pre-qualification
- Collaboration
- Online Approval
- eRFx & Reverse Auction
- Forward Auction
- Reporting and Analytical Services
- Portal Advert Placement
- Supplier Verification
- Pre-qualified Supplier Sourcing
- Tender Processing

NipeX, DELIVERING VALUE TO ITS STAKEHOLDERS

CONTACT
Customer Support Team
NAPIMS-NipeX
8 Bayo Kuku Road
Ikoyi, Lagos

01-4484360 Ext 0, 08032850332, 07067136623, 09038452851
customersupport@nipex.com.ng
www.nipex-ng.com

NCDMB partners Dangote Refinery on local content implementation

NIGERIAN CONTENT DEVELOPMENT and Monitoring Board (NCDMB) has declared its intention to partner with Dangote Petroleum Refinery and Petrochemical Free Trade Zone Enterprises (DPRP) on the effective implementation of the local content policy.

The director, monitoring and evaluation, NCDMB, Akintunde Adelana, who represented the board's executive secretary, Simbi Wabote, made this disclosure during the DPRP Nigerian Content Sensitisation/Awareness Creation Programme, entitled: "Let's Walk the Nigerian Content Talk Together," at Lekki Free Trade Zone, Lagos.

Adelana said, "The Dangote Refinery project is expected to close a major gap in the supply of petroleum products in the country. We consider this as a very important project and we are willing to partner with the company to ensure full implementation of the local content policy. We embarked on this journey with the company a long time ago and we are ready to partner with the Dangote Group."

Image Credit: Dangote

NCDMB and Dangote representatives at the Lekki refinery.

Wabote described the Local Content Act as the quantum of composite value added to, or created in the Nigerian economy by a systematic development of capacity through the utilisation of Nigerian human, material resources and services in the oil and gas industry.

Aker Solutions offer brownfield services for BP's Angolan operations

AKER SOLUTIONS, AN Oslo-based oil services company, has received a five-year agreement to supply brownfield modifications, maintenance and operations support for BP's Greater Plutonio and PSVM fields offshore Angola. The scope of work includes the supply of engineering, procurement, and construction services for brownfield projects on the floating production, storage and offloading (FPSO) vessels located at each field. This includes support for upgrades to process, chemical and marine support systems, as well as the refurbishment of old piping and equipment.

Image Credit: Aker Solutions

Aker Solutions will be providing a wide scope of work for BP in Angola.

Luis Araujo, chief executive officer at Aker Solutions, said, "We are delighted to support BP in Angola, an important market for Aker Solutions. We have a strong record of successful delivery in Angola, having provided subsea support to key projects such as Dalia and Kaombo. We are now pleased to expand this offering to include topside maintenance, modifications and operations services in West Africa."

For more on oil and gas developments southern Africa, turn to our cover story on p24.

Fugro and Jagal join forces in Nigeria

FUGRO HAS ANNOUNCED a new venture which aims to stimulate business development in Nigeria's marine industry with a new agreement with Jagal, an established Nigerian corporation that operates leading energy businesses and manages a diverse portfolio of investments.

As a 100 per cent Nigerian entity the new venture, Fugro Marine Nigeria Limited has plans to optimise marine site characterisation and asset integrity services in the country. Fugro has a long history of supporting the offshore oil and gas and marine construction sectors in Nigeria, and is a specialist in deepwater operations.

"The new business will leverage the strengths of both parties to undertake large, integrated marine site characterisation projects and asset integrity programmes," said Peter Boon, business development manager of Fugro for Africa.

"Jagal's commitment to high standards in health and safety is aligned with Fugro's and, along with our objective to indigenise our specialist services into the local market, this co-operation will enhance our support of the offshore energy industry in Nigeria," Boon added.

This is not Jagal's first joint venture in Nigeria. In 2015, Trans Global Projects established a local company in the West African country and formed a partnership with Jagal to predominantly serve clients in the oil and gas industry. In particular, the joint venture was established to provide end-to-end logistical services.

Detcon, Oldham, Simtronics and GMI are now part of 3M Gas & Flame Detection, backed by the science of 3M. With over 100 years of combined industry experience, 3M Gas & Flame Detection is advancing the industry through innovation, technology and service.

Learn more about how we're developing technology today that will change the way you look at detection solutions tomorrow.

Visit gasdetection.3M.com

أديبك
ADIPEC
Abu Dhabi International Petroleum Exhibition & Conference
12 - 15 November 2018

Visit us booth 9415

Themes of economic development and sustainability for Nigerian local content forum

"DRIVING ECONOMIC DEVELOPMENT and Sustainability" is the theme for the eighth Practical Nigerian Content Forum (PNC), which will be held in Yenagoa, Nigeria from 3-6 December.

To ensure the long-term future of the PNC, a Memorandum of Understanding has been signed between the Nigerian Content Development and Monitoring Board and CWC Events Africa.

Under the terms of the five-year MoU, the NCDMB and CWC will organise the PNC Forum with the aim of providing a platform for government and industry players in the Nigerian oil and gas sector to deliberate on how Nigerian Content can unlock discovered potential.

Image Credit: Cristiano Zingale (kouam)/Flickr

Creating meaningful jobs for Nigerians is a focus of the PNC event.

The PNC Forum will provide an opportunity for stakeholders to discuss the current challenges being faced within the market and explore solutions.

This year's speakers include HE Henry Seriake Dickson, executive governor of Bayelsa State, Dr Emmanuel Ibe Kachikwu, Nigeria's petroleum minister, and Dr Maikanti Bari, group managing director, NNPC.

"I look forward to welcoming oil and gas industry players to what promises to be a useful and impactful gathering," said Eng Simbi Wabote, executive secretary, Nigerian Content Development and Monitoring Board.

Unique Group to provide hydrographic survey vessel package in South Africa

THE MARINE AND subsea division of Unique Group, has entered into a high-value contract with the Southern African Shipyards to provide a turnkey package for hydrographic survey vessels and a hydrographic office set-up.

The project will include multiple new-build vessels, a main vessel and support vessels. Unique Group will act as a technology partner to the shipyard and provide the vessel's dynamic positioning systems and navigational equipment package.

Image Credit: Stuart Rankin/Flickr

Offshore South Africa could have multiple opportunities for oil and gas.

As part of the project, Unique Group will also provide complete integration of the hydrographic equipment package, which will include centralised operations between the main vessel and smaller support vessels.

The hydrographic office set up onshore will be updated with new computer hardware and the latest processing software for chart production, data collection, processing, reporting and backup solutions. Unique Group will provide a full package including technical support and relevant operational and maintenance training for the staff.

For more on the latest in hydrocarbon exploration in South Africa and neighbouring countries, see p24.

New exploration rights in Mozambique

ENI HAS ACQUIRED new exploration rights in Mozambique. The contract is for the exclusive exploration and development rights of the offshore block A5-A, in the deep waters of the Northern Zambezi Basin, approximately 1,500 km north east of Maputo.

The block extends over an area of 5,133 sq km, at water depths between 300 and 1,800m, in a completely unexplored zone in front of the town of Angoche.

Eni is the operator of Block A5-A Consortium, with a participating share of 59.5 per cent owned by its subsidiary Eni Mozambico. Other partners are Sasol, (25.5 per cent), and Empresa Nacional de Hidrocarbonetos (15 per cent).

Eni has been present in Mozambique since 2006, following the acquisition of a stake in the Petroleum Contract of Area 4, in the offshore Rovuma basin, with an estimated 2,407 billion cubic meters of gas in place. The Coral development programme includes the construction of a floating plant (FLNG). The plant will have a liquefaction capacity of approximately 3.4 million tons per year. Construction has started in June 2017. Production is expected to start in 2022.

The Mamba Complex development programme includes the construction of an onshore plant composed by two trains for gas treatment and liquefaction, with a liquefaction capacity of 15.2 million tons per year. The project is expected to be sanctioned in 2019 and production is expected by 2024.

To read more on Mozambique's FLNG success, see p28.

WAIPEC sells out three months in advance

THE THIRD WEST African International Petroleum Exhibition and Conference (WAIPEC 2019) has officially sold out, three months ahead of its opening date in January 2019 and will now take the whole of the Eko Convention Hall, to meet the new demand for extra exhibition space.

Hosted by the Petroleum Technology Association of Nigeria (PETAN), the event is focused on forging partnerships between national oil companies and private companies from the whole of Sub Saharan Africa. Major regional stakeholders as well as leading E&P firms and partners will be keen to develop and drive new business across the petroleum sector.

Next year's event will feature in excess of 25 technical and strategic conference sessions.

At the last event, organisers welcomed more than 6,000 visitors, more than 500 delegates, 300 participating companies and more than 80 experts.

www.waipec.com

Petrochemicals set to be the largest driver of global oil demand: IEA


Image Credit: Charles Rondeau

Demand remains high for petrochemical products such as plastics.

PETROCHEMICALS WILL SURPASS cars, trucks and aviation in future oil demand growth, according to a study by the International Energy Agency (IEA).

They are expected to account for more than a third of the global oil demand growth to 2030, and almost half the growth to 2050, adding almost 7mbpd. They are poised to consume an additional 56bcm of natural gas by 2030 and 83bcm by 2050.

Dr Fatih Birol, IEA's executive director, said, "Our economies are heavily dependent on petrochemicals, but the sector receives far less attention than it deserves. Petrochemicals are one of the key blind spots in the global energy debate, especially given the influence they will exert on future energy trends. In fact, our analysis shows they will have a greater influence on the future of oil demand than cars, trucks and aviation."

Oranto Petroleum launches schools construction project in South Sudan

ORANTO PETROLEUM HAS completed the award of a contract for the construction of two primary schools to be located in Yirol and Rumbek, two communities located in central South Sudan and northwest of Juba. Estimated in excess of US$800,000, the schools project will be executed by local construction company Dynamic Supplies and Construction, in line with Oranto's policy to engage local content in all its activities in South Sudan.

The construction of the schools signals a value addition to South Sudanese citizens from their oil and gas as championed by Oranto, against the backdrop of peace initiatives by the South Sudanese government.

"The construction of these two schools is a reflection of Oranto's engagement to invest in social infrastructure in all areas where we operate in Africa," saidd Prince Arthur Eze, founder and executive chairman of Oranto. "Oil has to benefit all citizens and education is key to development. We are only going to see true peace and development in Africa when we leave no child behind and continue to invest in our human resources."

Clontarf moves ahead with Ghana exploration project

CLONTARF ENERGY, OIL producer and explorer, has announced that all outstanding issues have been resolved with Ghana's state oil company GNPC on Tano 2A Block. The dispute dates back to 2008 when an agreement involving the Pan Adrean Consortou, in which Petrel Resources, a Ghanaian company which now holds a 30 per cent stake, and Clontarf, which holds a 60 per cent stake, was never ratified by the GNPC. The matter was settled out of court in 2014 and the final agreement has now been reached.

The statement added: "The signed petroleum agreement is now being sent to the Cabinet. All legal proceedings have been dropped and all issues resolved to our satisfaction," said a statement released by the company in October. After a period of slow progress, Ghana's current NPP Government has galvanised the licensing effort. The administration is pro-development, and actively reviewing historic Petroleum Agreements, with a stated focus on early exploration, discoveries and output. During 2018 the Ghanaian Ministry of Energy and the Ghanaian National Petroleum Commission considered the current re-application by Pan Andean Resources Ltd (30 per cent Petrel, 60 per cent Clontarf, 10 per cent local interests) over the original Tano 2A licence block acreage in the prospective Tano Basin, West Africa."

Angolan oil and gas body under pressure from IMF

Head of the IMF, Christine LaGarde,

Image Credit: IMF

AGAINST A BACKDROP of the International Monetary Fund forecasting 2.3 per cent growth for Angola, the country's new Oil and Gas Authority is under press ure to move ahead quickly with plans to break up the oil industry monopoly of Sonangol, the national oil company.

The IMF has called on the new authority to be transparent and follow the best practices of Morocco and Senegal's offshore markets to help atract investment and maximise opportunities.

Offshore blocks 15 and 17 are mature projects but investment is still needed to extend the life of these operations. BP, Chevron, Eni, ExxonMobil, Statoil and Total are already involved.

To read more about the emerging and established markets of southern Africa, see p24.

Big 5 Board Awards return to honour industry leaders

THE BIG 5 BOARD Awards, organised by the Africa Petroleum Club, return to London this year to honour industry leaders and raise funds for African wildlife conservation projects with a charity auction.

The awards include Distinguished Individual Contribution to the African Industry; Corporate Contribution to African Petroleum & Excellence; Best Independent Player In Africa; Best African National Oil Company; Best Service & Supply Company; and the special award for Africa's Oil Legend 2018.

Gayle Meikle, president of Africa Petroleum Club, will open proceedings and the awards will be presented by Woodside, the corporate club patron.

After the awards ceremony, there will be a keynote speaker, followed by an address from the guest of honour, Baroness Lynda Chalker on Africa's wildlife war. Baroness Chalker is involved in numerous conservation initiatives in Africa. The event will conclude with a charity auction and a networking reception. It will be held on Thursday 22 November at the Royal Institution.

For more information about sponsorship opportunities and to book places at the event, log on to www.africa-petroleumclub.com

Egypt's petroleum sector to benefit from ITFC financing

The signing of the final agreement in Cairo.

Image Credit: ITFC

THE INTERNATIONAL ISLAMIC Trade Finance Corporation (ITFC) has signed two new Agreements with the Egyptian government represented by the Egyptian General Petroleum Corporation (EGPC) and the General Authority for Supply Commodities (GASC).

The agreement was initially signed in January 2018, with the objective to finance the importation of commodities, including petroleum, petroleum products and gas. Between 1985 and 2007, the Islamic Development Bank approved around US$1.675 billion for Egypt, mostly to finance the importation of petroleum and refined petroleum.

Saipem inks offshore E&C contract for Congo

SAIPEM HAS SIGNED new offshore E&C contracts for the Republic of Congo, as well as the growing hydrocarbons market of Azerbaijan and the established North Sea region.

Through its subsidiary Boscongo SA, Saipem has been awarded a Modification, Maintenance and Operations (MMO) contract by Eni Congo SA for the provision of maintenance services, modifications and improvements on all Eni Congo offshore sites in the Republic of Congo over a 36-month period.

The scope of work includes on-site maintenance activities, such as troubleshooting, planned and unplanned maintenance as well as the supply of spare parts, materials and workshop activities at Boscongo yard (Pointe Noire).

Stefano Porcari, chief operating officer of Saipem's E&C Offshore Division, commented: "These new offshore contracts confirm Saipem's success in achieving its strategy aimed at consolidating its leadership in traditional markets, such as SURF, Conventional and Pipelines, as well as at diversifying its business in non-oil capex segments, such as the modifications/maintenance/operations market."

"The SURF contract, in particular, confirms the importance of Azerbaijan, where we have been working with continuity for several years, bringing our expertise to create an enduring and fruitful relationship in the country as well as contributing and consolidating our local content endeavour," he added.

BHGE and AFRC partner up for manufacturing challenges

Image Credit: BHGE

The partnership aims to push the limits of manufacturing for oil and gas.

THE UNIVERSITY OF Strathclyde's Advanced Forming Research Centre (AFRC) and Baker Hughes, a GE company (BHGE), have joined forces to explore how some of the latest advanced manufacturing tools and processes can drive more efficient, smarter ways to reduce cost and increase productivity across BHGE's operations.

BHGE will work with the AFRC's team of engineers and researchers to improve its manufacturing processes and delivery of services. Using its expertise and state-of-the-art equipment, the AFRC will help BHGE identify opportunities to cut costs and cycle time, while extending the lifespan of oilfield equipment required for operations in increasingly high temperature and extreme pressure environments.

Nigeria's information minister says Dangote oil refinery is on schedule with a 2020 production goal

DESPITE ONGOING MEDIA reports about the pace of progress of the construction of the Dangote oil refinery in the Lekki Free Trade Zone, Lai Mohammed, Nigeria's information minister, has told Reuters that he expects production to start at the refinery around 2020. Aliko Dangote, one of Africa's richest men, has secured more than US$4.5bn in debt financing for the refinery project which costs up to US$14bn.


Image Credit: Dangote

Aliko Dangote discussing the importance of free trade for Africa.

"When one looks at the money which has been raised from private funds, banks, it can't afford to miss the deadline and it's working (round) the clock to ensure that the refinery becomes operational in 2020 or thereabouts," Mr Mohammed told Reuters in London. Since the refinery project was announced, Mr Dangote has been consistently optimistic about the progress of construction, and the company has issued a statement about its commitment to hiring returnee engineers who have been training in India at the Bharat Petroleum Company.

The company's director of human capital management and project support, Mohan Kumar, said the company is laying a solid foundation for take off with the training of the engineers. They are recruited and trained to witness the building of the refinery from scratch. He said the engineers spent two months in classroom training and three months undertaking on-the-job training.

Cormorant-1 well plugged and abandoned

TULLOW OIL HAS announced that the Cormorant-1 exploration well in the PEL-37 licence, offshore Namibia, encountered non-commercial hydrocarbons and the well is being plugged and abandoned.

The well was drilled to a total depth of 3,855 metres. Sandstones were encountered but these proved to be water-bearing. Wet gas signatures, indicative of oil, were encountered in the overlying shale section. Important geological data has been gained from this well, and, in combination with high quality 3D seismic data, will provide valuable insights into the prospectivity of the Group's Namibian acreage in PEL-37 and PEL-30. In a statement, Tullow said that expenditure on the well is expected to be in the region of US$5mn.

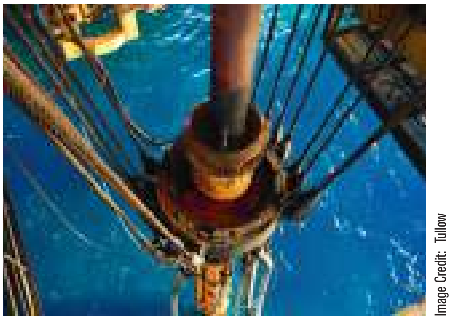


Image Credit: Tullow

The abandonment of Cormorant-1 has been a learning experience.

"The Cormorant-1 frontier exploration well was a bold attempt to open a new oil play in this area of Tullow's offshore Namibia acreage," said Angus McCoss, Tullow's exploration director. "While this is not the outcome that we had hoped for, the efficiency of our drilling and our risk management processes resulted in a low financial exposure to this well."

No BP Egypt asset acquisition deal for SDX Energy

SDX ENERGY, WHICH focuses on North African oil and gas projects, has announced that talks to buy some of BP's Egyptian assets have been abandoned. It had been reported earlier this year that BP was on the hunt for buyers for a stake in its Egyptian oil and gas business, which was estimated to be worth around US$500mn.

SDX has requested the restoration of trading on AIM and the TSX Venture Exchange.

In a statement, SDX chief executive Paul Welch said, "Discussions regarding its proposed acquisition of a significant package of assets in Egypt from BP have been terminated by mutual agreement."

He described the abandonment of the deal as "disappointing". An update from SDX said that the company continues, in line with its stated strategy, to review and pursue inorganic growth opportunities across its areas of operations in North Africa.

"It was an exciting opportunity but ... we are screening potential deals all of the time and we know that there will be others that will serve to fast track our stated goal to be a North Africa-focused (E&P company) of scale," Mr Welch added.

New Age finds gas and oil in Cameroon's Etinde field

Image Credit: CIFOR/Flickr

Discoveries could be a boon for Cameroon.

NEW AGE (African Glocal Energy) has announced the successful completion of an appraisal programme in Cameroon's Etinde field with proven hydrocarbon discoveries.

The US$55mn two-well appraisal programme commenced in May 2018, with the drilling of well IM-6, which successfully appraised the Intra Isongo section of the field, establishing a lower gas water contact and adding an additional 150-250 bcf of wet gas resources. The second well, IE-4, was targeted 2.8 km north west of the discovered IE field, adding resources down dip of the proven IE-3 hydrocarbon contact. Reservoir horizons came in on prognosis, and a 12-metre interval of the well was tested at a flow rate of 17.1 mmscftg/d and 8780 bopd on a 56/64" inch choke.

Morocco and Egypt offer exciting gas prospects according to SDX

PAUL WELCH, CEO of SDX, addressed the Africa Energy World Upstream summer reception on the company's Moroccan and Egyptian plans. In his opening address, Richard Norris, oil and gas adviser, Helios Partners, focused on opportunities in Mozambique, Tanzania, Kenya, Uganda, Egypt, Equatorial Guinea and South Africa, saying the gas focus for Africa is largely domestic and can to "lift people out of poverty".

Mr Welch talked about the prospects SDX has in North Africa, particularly Egypt and Morocco, saying the operations in the two countries had "very different characteristics and potential for very different reasons." Both prospects are onshore but the Egyptian operation is high volume for a growing gas market, while the Moroccan operation is low volume for an under-served gas market. SDX's South Disouq field in Egypt has five wells of which four have been successful, potential is at 2tcf, drilling costs are low and fiscal terms are "moderate," with Mr Welch saying SDX is "optimistic about decent returns." Meanwhile, the Moroccan field was described by Mr Welch as a "simple business" with the gas needing "little to no treatment," no royalties paid to the Moroccan government thanks to a 10-year tax holiday, low drilling costs, and a pipeline capable of 24m cf/day currently transporting 6m cf/day. The potential 50 bscf of gas would be "laughable in most parts of the world" but should prove to be boon to SDX and Morocco, he told the audience at the event.

Image Credit: CucombreLibre/Flickr

Gas can contribute to development in Morocco and Egypt.

Total and Sonatrach boost partnership for Algerian gas and petrochemicals

SONATRACH AND TOTAL have signed two agreements to strengthen their comprehensive partnership, which was first announced in 2017. The two agreements are a new concession contract to develop the Erg Issouane gas field located on the TFT Sud permit; and a shareholder agreement to create STEP (Sonatrach Total Entreprise Polymères), a petrochemoicals joint venture.

The TFT Sud permit is located south of the Tin Fouyé Tabankort (TFT) field, of which Total is a long-standing partner. Sonatrach (51 per cent) and Total (49 per cent) will develop the reserves of Erg Issouane located on the TFT Sud permit estimated at more than 100 million boe.

Meanwhile, STEP will be responsible for carrying out a joint petrochemical project in Arzew, western Algeria. The project includes a propane dehydrogenation unit and a polypropylene production unit with an output capacity of 550,000 tons per year. The two partners are planning to start the front-end engineering and design (FEED) from November. This project will allow to valorise propane by transforming it into polypropylene, a plastic for which demand is growing strongly.

Image Credit: Polycart/Flickr

Polypropylene, a thermosetting plastic, has a wide variety of uses.

Eco Atlantic gets PEL 30 green light in Namibia

ECO ATLANTIC OIL & Gas has received the final Environmental Clearance Certificate to drill an exploration well on the PEL 30 block from the Namibia Ministry of Environment and Tourism.

The company has completed seven years of exploration on the Cooper Block, including regional geological studies, fracture analysis, slick studies, the review and interpretation of 5,000 km^2 of 2D and an 1,100 km^2 3D Survey. In addition to its own ongoing interpretation, Eco has contracted independent studies from Petroleum Geo-Services, Azinam, Tullow Oil and Gustavson Associates.

Eco and its partners have identified the Osprey prospect on the Cooper Block within a sand filled channel and fan system in the Cretaceous sequence. The prospect is estimated to contain 882mn barrels of oil equivalent. The licence partners continue to contribute their own analysis and work towards determining an exact location for the drilling of an exploration well on Osprey.

"We are pleased with our work to date on the Cooper Block and appreciate the detailed analysis it has received both internally and with our industry partners," said Colin Kinley, Eco Atlantic's chief operating officer. "We purposely have shared our interpretation with our partners and industry experts to gather all the regional learnings as exploration matures in this basin. With the final environmental certificates now in place we anticipate moving shortly to selection of drilling location, rig contract discussions and engineering planning for a well in Q3 2019 or Q1 2020."

Capacity building and professional competence explains our mission

Tolmann Allied Services Company Limited

NEW OPITO APPROVAL

RE-DIGITAL BOSIET

TOLMANN has been granted OPITO Approval for the following newly introduced courses for the Oil & Gas Industry. These courses include:

• BOSIET WITH CA-EBS (Digital Delivery) • BOSIET WITH EBS (Digital Delivery
• TROPICAL BOSIET (Digital Delivery)

BENEFITS

- Available to you at anytime, anywhere internet access is available.
- It also includes ongoing knowledge checks to better measure your understanding of the standards learningcontent.
- It gives you the opportunity to learn at your own pace and gain back time through reduced days away from work.

OTHER BENEFITS INCLUDE:

- It eliminates cost on:-
  a)Security b)Logistics c)Accomodation
- It saves time for management
- Planning for offshore personnel is made easy.

OFFICE ADDRESS
Deepwater Survival Training Centre (DSTC)
78 Trans-Amadi Industrial Layout, Mothercat
Junction, Port Harcourt, Nigeria
Tel: +234 803 312 9962, 0809 990 1280
Email: tolmann@tolmann.com; admin@tolmann.com
Website: www.tolmann.com

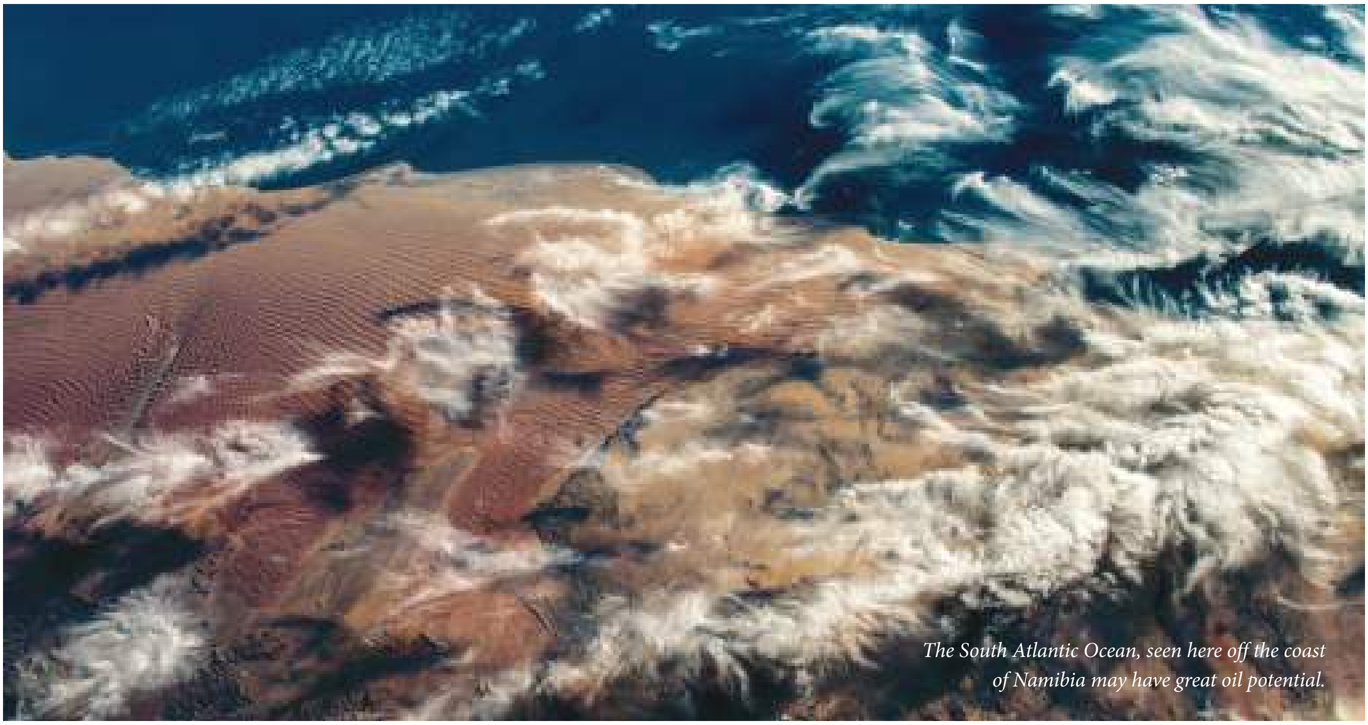
OFFICE ADDRESS
Offshore Safety Training Centre (OSTC)
58 Trans-Amadi Industrial Layout, Nkpogu
Port Harcourt, Nigeria
Tel: +234 803 312 9962, 0809 990 1280
Email: tolmann@tolmann.com; admin@tolmann.com

Opito Approved Training Provider
"TRAINED WITHOUT COMPROMISE"

OPITO

SOUTHERN AFRICAN EXPLORATION: A NEW FRONTIER

Economist Moin Siddiqi examines the potential oil and gas riches across the emerging markets of southern Africa in this special report.



The South Atlantic Ocean, seen here off the coast of Namibia may have great oil potential.

Image Credit: Stuart rankin/Flickr

THE SOURCE OF commercial discoveries or hotspots are evolving across Africa. Over the last two decades, reserves additions were driven mainly by offshore Angola and Nigeria, along with onshore finds in Niger, Chad and Sudan, as well as offshore gas in Egypt. Production of deepwater oil continues to grow in the Gulf of Guinea, while new-resource development in Senegal/Mauritania maritime borders and East Africa in prolific Rovuma basin are expected to become the other main engines for growth. The potential riches of southern Africa's deep-waters (southern tier) have yet to be unravelled, off South Africa and Namibia.

> "South Africa's geological formations are dominated by ancient sediments with evidence of oil-prone source rocks"

International oil companies (IOCs) have fared well in Africa, thanks to the licensing of acreage and mergers and acquisitions (M&As). These companies with strong operating capabilities and capital have moved into the new, technically complex frontiers of deep/ultra-deepwater oil and unchartered countries in research for recoverable oil and gas reserves and new production.

Africa's South Atlantic coast may hold an untapped oil-resource base – tentatively estimated at 75bn barrels, plus 26bn barrels of shale oil, thus making it vital for majors and independents to develop and exploit these resources effectively.

Between two 'proven' hydrocarbons countries (Angola and Mozambique) lie Namibia and South Africa with promising offshore acreage. The geological formations of Southern Africa are dominated by ancient sediments, underlaid by basement. There are evidence of oil-prone source rocks, reservoirs and subsalt potential in the largely underexplored southern tier.

These new prospects may prove attractive to investors, particularly with Angola currently requiring an oil price of

US$82 a barrel to balance its budget, according to an EnergyWise report.

The break-up of South Atlantic basins

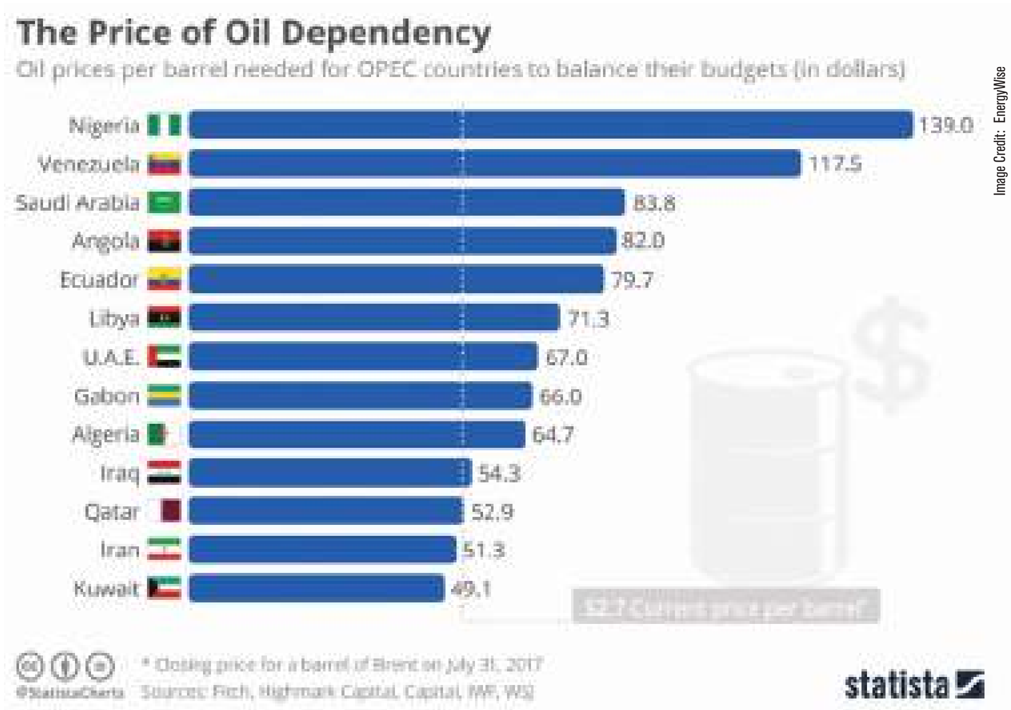
Recent re-processed seismic images of Jurassic-Early Cretaceous formations can be used as analogues for future exploration activity in Namibia and South Africa. The Paraná-Etendeka LIP erupted roughly 130mn years ago during the rifting of Gondwana super-continent, which saw Africa, South America and other southern landmasses breaking-up. Since LIP was formed before Africa and South America had fully rifted, rocks of the Paraná-Etendeka are, today, bisected by the Atlantic Ocean, with one portion located in Namibia (Etendeka section) and the other in South America (Paraná section).

The South Atlantic was separated in Late Jurassic along the Agulhas-Falkland Fracture Zone (AFFZ). Earth's history shows Outeniqua basin (SA) is a conjugate margin of the Falkland Plateau (offshore Argentina) where explorers recently reported discoveries of one billion barrels of recoverable oil reserves in North Falklands basin in the south-western corner of the South American plate.

Prospective areas

Namibian coast prospects could be on par with the North Sea or Gulf of Mexico – with estimated reserves of 11bn barrels identified in mid-2012, similarities to Angolan and Brazilian plays. These estimates refer to 'probable' reserves (50 per cent recovery certainty) or 'possible' reserves (10 per cent recovery certainty).

Four main offshore basins are Luderitz, Namibe, Orange and Walvis. All share geological characteristics with the South American littoral, with which they were adjacent some 150mn



A chart which demonstrates the oil price required to balance the budget for a range of OPEC members, including Angola.

years ago. Namibia can also point to the success of Angola (northern neighbour), with proven reserves of 9.5bn barrels and output (1.63mn bpd) in 2017, Africa's second largest after Nigeria.

The supermajors (Shell, ExxonMobil, Total), Portugal's Galp, Tullow Oil and India's state-owned ONGC Videsh Ltd are among those holding interests in offshore blocks. Canadian-based Eco Atlantic plans drilling a well on its Osprey prospect in the Walvis basin, where it is reckoned to contain about 700mn barrels oil-resources.

Other independents like UK's Chariot Oil & Gas, Impact Oil & Gas and Pancontinental Oil & Gas (Australia) are also farming in, excited by the involvement of supermajors in Namibian blocks.

Namibia's largest offshore gasfield is Kudu discovered in 1974 by Chevron in the Orange basin containing proved reserves of 1.3 trillion cubic feet (Tcf); nine Tcf potential. The field's operator is Tullow in partnership with National Petroleum Corp of Namibia (Namcor) and Itochu (Japan). Namibia has yet to monetise gas reserves, though opportunities exist in power generation and exports in the form of floating liquefied natural gas (FLNG), which makes smaller finds commercially viable like Golar's Hilli Episeyo 1.2mn tonnes/year facility operated by Perenco (France) off Cameroon. There is also a minor potential for shale gas in Namibia.

Major offshore areas in South Africa (SA) are Orange and Outeniqua basins. The former near Namibia is believed to be gas/oil prone, although modest exploration activity has occurred in deepwater area. In 2015, Shell was granted an environmental authorisation for exploration drilling. However, the major is probably years off from confirming any 'proven' oil-resources (90 per cent certainty of being produced) under existing economic conditions with today's technology.

"Namibia's offshore prospects could be on par with the North Sea or the Gulf of Mexico, with Kudu as the largest offshore gasfield"

The Outeniqua basin, situated off the south coast, is relatively unexplored, but a considered prospective by UK-based Spectrum, seismic data-processing co. This area consists of Bredasdorp, Pletmos, Gamtoos and Algoa sub-basins in shallow water and Southern Outeniqua sub-basin, which is deep-water extension of those shallow water sub-basins.

The northeast-southwest trending Agulhas-Falkland Fracture Zone (AFFZ) that was developed during the South Atlantic Break-up bound the basin. The fracture zone runs from Durban (up the NE coastline of South Africa) to Argentina. There are some 300 offshore wells in SA.

The country's largest undeveloped gasfield is Ibhubesi

KARAM
knowing your needs better

HANDY LINE

(Temporary Horizontal Lifeline)

Ref. Horizon PN 4001

EASIER and SAFER Access to Difficult ANCHORAGE POINTS!

ADVANTAGES

- Easy to install, remove and store.
- Inbuilt winch for easy retraction of rope into the case for fast, simple & safe dismantle.
- Inbuilt shock absorption mechanism to limit the impact forces during fall arrest.

CE

Conforms to
EN 795:2012 Type C &
TS 16415:2013 Type C

For Further Information Contact :
KARAM SAFETY DMCC

www.karam.in | Tel.: +971 44315221 | e-mail : dubai@karam.in

Unit No. 2108, 1- Lake Plaza, Jumeirah Lakes Towers, P.O. Box : 27307, Dubai, UAE

Gas, in particular, can help with southern African energy security, such as the Avon Peaking Power plant in South Africa.

Image Credit:

owned by local-based Sunbird (the operator) and PetroSA located in Orange basin. It holds 540bn cu ft of recoverable reserves, plus 4.3mn barrels of condensate (very light oil).

The operator aims to reach a natural gas supply agreement with Eskom (national utility) and to begin production by 2020 to replace some of South Africa's diesel-fired power stations. The environmental authorisation for Ibhubesi project was granted in 2017. Major crude discoveries to date in the Bredasdorp sub-basin are Oribi (1990) and Sable (1989) – each contains 50mn barrels of recoverable reserves. Appraisal wells reported the thin, water saturated sandstones in Oribi offshore oilfield owned by Soekor.

New energy prospect

Development of onshore shale gas resources (world's eighth largest) in SA beneath the Karoo basin (covering 300,000-km) can provide cheap feedstock for residential and industrial sectors which are currently reliant heavily on coal and short of liquid fuels. The US Energy Information Administration (EIA) estimated technically recoverable shale gas at 390 tcf, of which Whitehill, Prince Albert and Collingham formations hold 211; 96; and 82 Tcf, respectively.

Shale thickness matches North American plays, but geologic complexity, some land ownership issues and environmental concerns regarding water usage and fracking have delayed exploitation of SA's shale gas (unlike in the US). Hydraulic fracturing techniques are deployed to extract shale gas and/or increase oil flow by changing the nature of the underlying rock strata.

Still at preliminary stages, however, energy opportunity has attracted Shell, Total, ExxonMobil and Chevron – latter in partnership with Falcon (Australia), which holds 7.5mn acres of exploration permit in southern Karoo. Petroleum Agency South Africa (PASA) approved shale gas development in early 2017.

A 2012 report by Ed Reed "Setting Sights on SA Shale" noted that large-scale exploitation could boost economic growth. The report estimated that 1.4 trillion cubic metres of gas could be produced, adding an average of 200bn rand per year to SA economy. Furthermore, shale gas will help reduce fuel imports, while diversifying the 'energy mix' via replacing coal in electricity supply with gas-fired power plants, thus lowering (CO_2) levels in power generation.

Competitive edge

Those under-explored countries should offer IOCs more attractive fiscal terms – aimed at fostering competition for natural resources, greater efficiency in upstream sector and building sustainable production capabilities. But persuading IOCs to fund exploration in high-risk unproven blocks is hard because of volatile oil-prices and cost-factors. "Incremental drilling, near-field drilling, appraisal or just de-bottlenecking existing developments is where they are at now," noted Wood Mackenzie (WoodMac), UK's energy consultancy. This leaves frontier acreage such as Southern Africa in a difficult position. IOCs eager to boost revenues could divert upstream capital spending away from minor green areas towards proven blocks in Gulf of Guinea in west Africa.

However, if a country is unable to boast a massive find – then stable regulatory climate is equally as crucial as lower costs. IOCs investing in frontier acreage expect better deals from governments than established countries, notably Angola and Nigeria with lower upstream risks.

For example, the terms on Guinea Bissau licenses were adjusted to include more favourable arrangements for deep-water investment, including lower production royalty rates payable to the state. Explorers prefer dealing with efficient, un-bureaucratic National Oil Companies.

In sum, WoodMac believes 'frontier areas' notably Australia, Alaska, the Brazilian Equatorial Margin, Gambia, Namibia, Senegal and South Africa hold the greatest potential for hydrocarbons discoveries in the medium-term.

"Under-explored countries should offer more attractive fiscal terms aimed at fostering competition for natural resources"

A WORLD-FIRST FOR FLNG FINANCING IN MOZAMBIQUE

Paul Eardley-Taylor, head of Oil & Gas Southern Africa, Standard Bank explains how the world's first FLNG financing project – the largest-ever venture of this type for Africa – came to fruition.

STANDARD BANK, WITH an on-the- ground presence in 20 African countries, has an established oil and gas practice which serves relationships and executes transactions across the upstream, midstream and downstream sectors.

Africa started early in LNG, with Algeria exporting its first cargo to the UK in 1964. But, until 2017, despite its established position in upstream oil and gas, Africa had operational plants in only four countries: Algeria, Angola, Equatorial Guinea and Nigeria, with two plants in Egypt idle due to insufficient gas supplies.

This position is rapidly changing, with multiple onshore and Floating LNG (FLNG) projects under development, as well as Floating Storage Regasification Units (FSRUs) in operation and under development. One of the most exciting of these is Coral FLNG.

> "Africa's gas supply issues are rapidly changing with multiple onshore and FLNG projects in operation and under development"

An artist's impression of the Coral South FLNG vessel, the world's fourth-largest FLNG project.

Image Credit: Eni

Coral FLNG, with a debt size of US$4.7bn, marks Africa's largest-ever project financing and the world's first FLNG project financing. The project is led and operated by ENI with a 25 per cent holding, ExxonMobil farmed into Area 4 block last year with 25 per cent, all taken from ENI. The remaining stakes are held by CNPC (20 per cent), Kogas (10 per cent), Galp Energia (10 per cent) and ENH (10 per cent).

Within the transaction financing, Standard Bank was the largest single commercial lender; onshore account bank and security trustee; and was the only African lender to the project. The bulk of the financing was contributed by export credit agencies (ECAs) including BPI, KEXIM, Ksure, Sace and Sinosure (ECAs being a mainstay of global LNG financing).

Coral South is a field located within Area 4, which includes the Coral North and Mamba fields. Coral South is separate from the other fields and furthest from the shore. This distance is a major reason why the relatively new FLNG technology was chosen for development.

Coral FLNG is only the fourth FLNG project globally after Petronas's Satu, Shell's Prelude and Cameroon's Hilli Episeyo (none project financed). A consortium consisting of TechnipFMC, JGC and Samsung Heavy Industries was selected as EPCIC contractors.

The FLNG ship is under construction in South Korea and scheduled to reach the Mozambican shores around 2021 to ensure commissioning in mid-2022. Coral FLNG will produce 3.4 MTPA output to be

Image Credit: Standard Bank

Paul Eardley-Taylor from Standard Bank.

exclusively sold to BP. The upstream part of the project is 100 per cent equity funded and the liquefaction part project financed through $US4.7bn on a 60:40 debt equity ratio.

The project used multi-sourced project financing from five export credit agencies and 16 banks. Due to the scale of LNG projects (and their multi-sourced participation), project financing is typically used to fund LNG liquefaction projects. The ring-fenced nature of project financing means a very secure offtake is required to ensure the project can service its debt.

For Coral FLNG, BP will take 100 per cent of output but noting the project (and therefore the lenders) will naturally take the performance risk of the Coral South field.

“The project used multi-sourced project financing from five export credit agencies and 16 banks”

The Area 4 shareholders are generally seen as strong entities, able to provide the customary completion support seen in LNG debt financings. The government of Mozambique showed commitment to the project by establishing the necessary regulatory regimes and timely project approvals. Underlying all the Rovuma Basin's current and future LNG export projects is the 2014 Decree Law, which was passed following the completion and public dissemination of a macroeconomic study for area one prepared by Standard Bank. It is a great achievement for Mozambique that it was able to execute the Coral FLNG project even during an ongoing sovereign default.

As well as being an important standalone project, the significance of Coral is that its documentation is likely to be a major influence on the pending onshore LNG financings of Area 1 and 4, which together may require the raising of US$30bn debt in 2019 as part of US$50bn of final investments, which will transform Mozambique into a leading LNG player.

OPTIMISTIC OUTLOOK FOR REFINING CAPACITY IN NIGERIA

Between 2018 and 2022, Nigeria will be the growth engine of the refining industry in the Middle East and Africa, according to Global Data. Despite another delay to the Petroleum Industry Bill (PIB), investment remains buoyant. Georgia Lewis reports.

ACCORDING TO A report by Global Data, Refining Industry Outlook in Middle East and Africa to 2022, the Middle East and Africa will account for 42.6 per cent of the total global refining capacity. The total refining capacity in the region is expected to increase from 15.5 million barrels per day (mbd) in 2018 to 21.7 mbd in 2022.

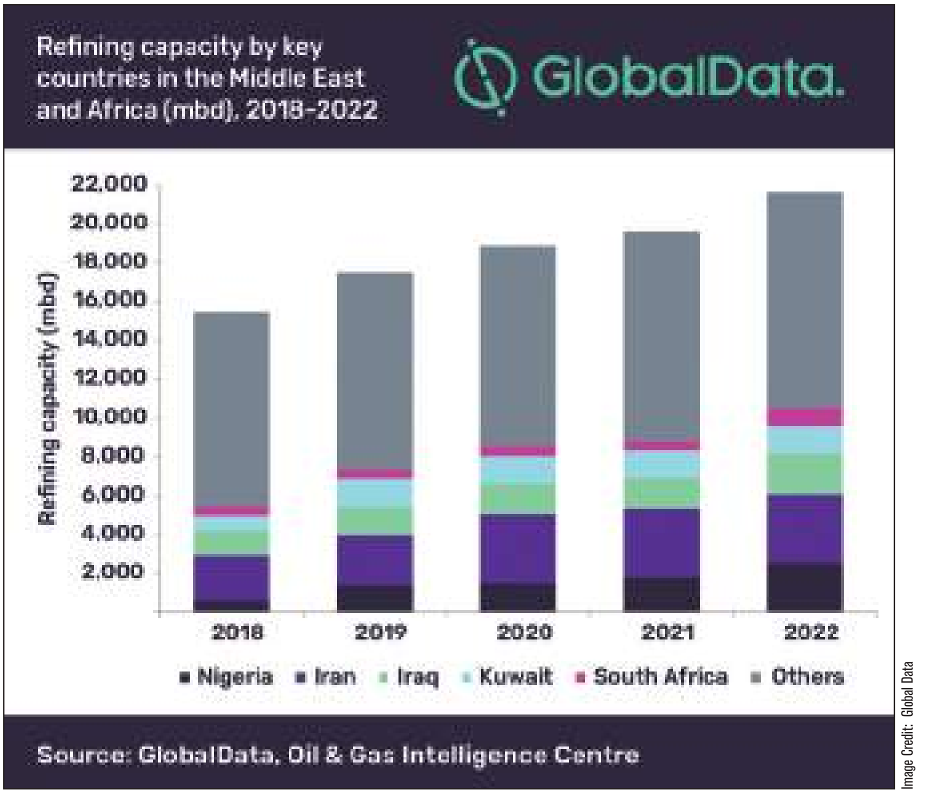
And Nigeria is predicted by Global Data's analysts to lead the way in terms of capex for refining projects – new build capex spending for the entire region is estimated at US$215.3bn and Nigeria is expected to lead the way with 25 per cent of this being spent in the West African country by 2022.

Optimism abounds in Nigeria with the country planning investment of around US$54.8bn for refining capacity additions of almost 2mn barrels per day (mbd) by 2022.

In tandem, Nigeria's oil refining capacity is expected to increase from 446 mbd in 2017 to 2,572 mbd in 2022 at an Average Annual Growth rate (AAGR) of 35 per cent.

Soorya Tejomoortula, Oil & Gas Analyst at GlobalData, explains, "Nigeria is increasing its crude oil refining capacity as it aims to become a net exporter of petroleum products, instead of being a mere net exporter of crude oil. The increase in refining capacity will also help the country to meet growing domestic consumption of petroleum products."

> "Nigeria is planning investment of around US$54.8bn for refining capacity additions of almost 2mn barrels per day by 2022"



A comparison of refining capacity for leading oil refining countries across Africa and the Middle East.

The investment in Nigerian refining appears to be unhindered by the latest delay to the passage of the Petroleum Industry Bill (PIB), which was passed by both houses of parliament earlier this year.

The bill fell at the final hurdle in August with President Muhammadu Buhari refusing to give his assent to the bill in its current form.

According to a statement from the executive, the president, who is also the country's oil minister, sent the Petroleum Industry Governance section of the PIB back to the National Assembly. Reuters reported that this is because of multiple issues, including the section's clause to reduce the power of the president and oil minister to oversee and award oil licences and contracts. The section of the bill has provisions for a regulatory body to take 10 per cent of oil revenues, rather than these revenues gong to federal, state and local governments. Ita Enang, an official of the presidency, said that the increased remit of an oil fund could lead to conflicts in interpretation and a lack of clarity.

DEVELOPING HYDROCARBONS FOR THE FUTURE IN SOUTH AFRICA

Petroleum Agency SA is optimistic about multiple offshore exploration projects in South African waters, with the aim of achieving energy security and a more diverse energy mix.

PETROLEUM AGENCY SA is South Africa's state-owned company established through a Ministerial Directive in 1999. The Mineral and Petroleum Resources Development Act came into operation on the 1st May 2004 and in terms of this Act, the agency received its mandate to operate. The agency is responsible for the promotion and regulation of exploration and development of South Africa's oil and gas resources.

There is an excellent case to be made for investment in South Africa's burgeoning oil and gas exploration and production sector, with shale gas representing a major opportunity. By facilitating the process of attracting qualified international explorers to invest in the oil and gas sector, we can further grow the South African economy and contribute to the aims of the National Development Plan 2030. The plan envisages that by 2030 South Africa will have an adequate supply of electricity and liquid fuels to ensure that economic activity and welfare are not disrupted, and that at least 95 per cent of the population will have access to grid or off-grid electricity. Both the National Development Plan and the Integrated Resource Plan call for natural gas to contribute a far greater percentage to South Africa's primary energy supply mix.

South Africa is working hard to meet its long-term energy needs with ambitious offshore programmes.

Previous challenges affecting investment decisions, such as the low oil price and the uncertainty introduced by the MPRDA amendment bill, are now a thing of the past. The oil price has recently made a dramatic recovery, while the MPRDA amendment bill has been withdrawn from Parliament. Both President Ramaphosa and Minister Matashe have explained oil and gas exploration will be governed by separate legislation, and no longer grouped under general mining legislation. South Africa is on the brink of major developments in the upstream industry and the next few years will be vital in determining its future energy profile and how oil and gas contribute to the greater energy mix.

The demand for energy has surpassed supply, and alternative energy sources are being sought to deal with the ever-growing demand. Petroleum Agency SA, together with the Council for Geoscience (CGS) and the Department of Mineral Resources (DMR) is conducting extensive studies into South Africa's potential shale gas resources. Natural gas has been discovered off the west coast of South Africa in the Atlantic Ocean (Ibhubesi gas field) and off the southern coast in the Indian Ocean (F-A, E-m and other fields of the Bredasdorp Basin). Both areas have great potential.

Other operations of interest include exploration of the deep water and ultra-deep water of the southern Orange Basin. There is continued interest in the ultra-deepwater of the northern sector. The deep water of the southern offshore, soon to be tested by Total, holds exciting potential for large oil reserves.

Oil and gas remain the most critical of energy resources, and Petroleum Agency SA is in full support of those entering the South African oil and gas exploration and production industries. The agency is fully committed to ensuring that our government and policy-makers sustain the sector for the benefit of all involved and will do everything in its power to advance the industry.


SOLENTA
AVIATION

PRIDE AND PASSION FOR NIGERIAN DEVELOPMENT

Dr Amy Jadesimi, CEO of Ladol, talked to *Oil Review Africa* about her unique career path from medical school to the Nigerian oil and gas industry. By Georgia Lewis.

Image Credit: Ladol

Dr Amy Jadesimi is optimistic about the future of Ladol and proud of the company's achievements so far.

DR AMY JADESIMI, CEO of Ladol, started her career path away from the oil and gas industry: "I had the opportunity to go and study medicine at Oxford - it is a six-year course and there were a lot of opportunities to explore different aspects of the medical field."

She was going to intern for a female surgeon after graduating but she was offered a job with Goldman Sachs. The surgeon told her to take the position with the investment bank and kept the medical opportunity open for her, but Dr Jadesimi stayed with Goldman Sachs for three years and then went on to attain an MBA.

Her medical training and experience in investment banking gave her a good grounding for her work with Ladol - from the "zero work/life balance" to the involvement with "a diverse range of people"

> **"My maternal grandfather's example of sustainable industry with a strong local content focus was an inspiration for me"**

across all of the company's operations, such as engineers, designers and fabricators.

Her two grandfathers - one of whom was an industrialist and politician and the other of whom was an Anglican bishop - are cited by Dr Jadesimi as two of her greatest mentors. Her maternal grandfather, tragically assassinated in before she was born, was an industrial pioneer who founded a leather goods factory. She says his example of sustainable industry with a strong focus on local content was not only an inspiration for her but should also be an example for the wider Nigerian economy.

"He was a man of great integrity," she said.

Meanwhile, her paternal grandfather was "a deeply spiritual man" who lived all over Nigeria, connecting with people at all levels of society. Dr Jadesimi recalls wonderful memories of "these two people at the dinner table", as well as her own parents, who she describes as "both brilliant".

Since taking over as CEO of Ladol, Dr Jadesimi says there are achievements, great and small of which she is very proud. She told *Oil Review Africa* that the free zone and port development represent "a new type of infrastructure which is sustainable". In particular, Dr Jadesimi is proud of Ladol achieving ISO:9001 certification. She said this is the culmination of hard work by all members of staff and it is very important in terms of helping Ladol scale up and have credibility on a global level.

"It is important to celebrate the small victories as well as the big wins," she said. "It is an all-encompassing job but I love what I do."

www.ladol.com

THE RISE AND RISE OF WOMEN IN NIGERIAN OIL AND GAS

Women are increasingly being appointed to more and more senior roles in the Nigerian hydrocarbons industry. *Oil Review Africa* managing editor, Georgia Lewis, reflects on this powerful and important trend.

Image Credit: World Bank Nigeria/Flickr

Encouraging girls to finish their education and study STEM subjects is essential for the Nigerian oil and gas industry.

IN NIGERIA, LOCAL content is important, particularly in the oil and gas industry. It is about ensuring that meaningful jobs are created for Nigerians, reducing the reliance on expatriates and investing in training so that skills can be passed on. In particular, Nigerian women are stepping up to the plate in senior roles across Nigerian energy companies.

The signs are promising for even more women to come on board in the Nigerian oil and gas industry with more women studying and taking up careers in STEM (science, technology, engineering and mathematics) fields. When the Association of Professional Women Engineers of Nigeria (APWEN) was formed in 1982, there were only six members. Today, that organisation is more than 1,500-strong. Meanwhile, African Sisters in STEM, a non-government organisation aimed at attracting Nigerian girls to STEM fields, has given more than 500 students free training in areas relating to energy, computer programming and physics.

Low numbers of women participating in the oil and gas industry is not unique to Nigeria – on a global level women are under-represented – but more role models are now coming through and they are visible, such as Dr Amy Jadesimi, CEO of Ladol. The Nigerian Council of the Society of Petroleum Engineers is playing its part with programmes to develop women in the industry, and ensure gender in the society's membership and among industry leaders.

Africa Oil Week, of which Oil Review Africa is a media partner, has a well-established tradition of promoting women in the oil and gas industry not only in Nigeria but from the entire continent. This year's event will focus on the need to mainstream women in energy and develop blueprints for capacity building and gender equality. Every year, the event honours women at all career levels in the African oil and gas industry. At the 2016 event, Damilola Owolabi, then aged just 25, was honoured with the Global Women Petroleum & Energy Club Award for Africa for her work as CEO of Dreg Waters Petroleum & Logistics. Meanwhile, at the 2017 event, Donna Shodipo was honoured for contribution to oil and gas, giving an inspiring address to the women's luncheon. Ms Shodipo has more than 16 years' legal practice experience in the Nigerian oil and gas industry and is a partner in ACAS-Law, a leading law firm.

> **"Nigerian women are stepping up to the plate in senior roles across Nigerian energy companies."**

It is only through continued promotion and encouragement for girls and young women to complete their education, study STEM subjects and learn about the career opportunities in these fields, that the representation of women in the oil and gas industry will continue to grow in Nigeria and beyond. As Donna Shodipo herself said in her statement of personal motivation: "Above all, I intend to replicate myself as much as I can. I intend to change lives one thought at a time through words, leaving a legacy for generations to come."

Image Credit: Stena

Stena and Drilling Systems have integrated staff training into rig reactivation.

HOW A NEW TRAINING APPROACH CAN GET RIGS BACK TO WORK

As the oil and gas industry picks up in Africa and beyond, a revolutionary training approach is helping Stena Drilling prepare its personnel for faster, smoother and safer rig reactivations and operations.

STENA DRILLING HAS teamed up with advanced simulator developer and manufacturer, Drilling Systems to combine competency assessment and coaching in-the-field with the On-The-Rig (OTR) simulator for the first time to prepare drilling and lifting crews for rig start-ups and ongoing operations.

The approach of conducting realistic, rig-specific simulated exercises and tailored coaching to fill competency gaps at the work site is the first of its kind for the oil and gas industry. Following its success on the reactivation of Stena Drilling's semi-submersible, the Stena Don, Stena Drilling has signed a framework agreement with Drilling Systems to roll out this approach to three of Stena Drilling's ultra-deep water drillships: Stena Forth, Stand DrillMax and Stena IceMax.

Stuart Greer, operations manager at Stena Drilling explains: "The Stena Don had been in a warm stack situation from November 2016 with reduced crews. After securing a major contract, we needed to reactivate the rig in March 2018 and had new personnel joining some of the existing Stena Don crew. Quality, safety and performance are our top priority so we wanted to ensure all of our personnel were fully competent and able to cope with any eventuality.

"We approached Drilling Systems and together developed a three phased approach to preparing our drilling and lifting teams. We used Drilling Systems' mobile OTR simulator, which can be located on the rig itself and realistically mirrors drilling and well control operations, alongside individual coaching sessions. This meant the crew could familiarise themselves with well control situations and procedures, as well as operational running of equipment in a controlled, safe environment. We were also able to test a wider range of high risk operational scenarios which could never be replicated on the job. Because the functions and graphics are very representational of the actual Cyberbase system, crew members gain experience and confidence and are better prepared for the real thing.

> **"The project has helped us verify our crews' skills in a safe, fast and highly effective way, assuring the highest levels of safety and competence"**

"As the OTR system can also be operated without an instructor, we are keeping it in-situ to enable continuous training and development for the crew. This project has helped us test and verify our crews' skill levels in a safe, fast and highly effective way and gives our clients assurance that we are operating at the highest levels of safety and competency. Due to the success of the Stena Don project we will now be using the same approach on other rigs as they are brought back into use."

www.drillingsystems.com

CORROSION CONTROL FOR OIL AND GAS OPERATORS

Syed Kamran Ali, from Industrial Skyworks, writes about the different types of corrosion that impact on oil and gas assets and the importance of inspections to ensure small problems do not become serious risks.

An aerial inspection is a safe, effective way to spot corrosion.

Image Credit: Maersk Driling/Flickr

THE GREAT ITALIAN writer and poet Eugenio Montale, recipient of the 1975 Nobel Prize in Literature, was very true in saying: "Man cannot produce a single work without the assistance of the slow, assiduous, corrosive worm of thought."

Inevitably every engineering work in physical form has to be assiduously protected from environmental and process corrosion starting from the day it is installed. For high value assets designed for long life operations, protection against corrosion is extremely important.

Corrosion is caused inside as well as outside of piping, pipe fittings, pipelines, tanks and vessels. Crude oil and raw gas from the wellhead contain impurities, carbon dioxide, water and toxic gases all of which are corrosive in nature and cause internal corrosion of piping. External corrosion is caused by environmental impact and is a variable gamechanger for those companies operating in marine environments. Corrosion control for offshore structures requires critical corrosion control methods and techniques that will prolong structural life while saving millions in cost.

International standards organisations have identified measures to counter and minimise the effects of this phenomenon, such as API – RP 583 (Corrosion under Insulation and Fireproofing) and DNV-RP-C101 (Allowable Thickness Diminution for Hull Structure of Offshore Ships). Usually two approaches are used. The first approach involves incorporating for corrosion allowance in the design wall thickness of the vessel, pipe or structure, and the second one is to use corrosion inhibitors. NACE International provides globally recognised standards that are responsive to the latest changes in products and technology, and whose implementation streamlines processes and trims costs. The life of premium assets can be lengthened by following standards such as NACE SP0108-2008 (Corrosion Control of Offshore Structures by Protective Coatings) and NACE TM0194-2014 (Field Monitoring of Bacterial Growth in Oil and Gas Systems).

Offshore structures require special attention of designers as well as operators. DNV GL provides safety and sustainability advice to energy industries in the form of classification, technical assurance, software and independent expert advice. DNV-RP-C101 discusses types of corrosion in offshore structures:

General Corrosion: Where uniform reductions of material are found, criteria for minimum thickness of hull structural elements may be applied in order to determine average diminution values. Typically, repairs will include steel replacement to original scantlings and/or reinforcement.

Pitting corrosion: Random scattered corrosion spots/areas with local material reductions. The intensity of the pitting must first be estimated before applying criteria. Typically, repairs will include renewal of plates, building up pits by welding.

Grooving corrosion: Local line material loss normally adjacent to welding joints along abutting stiffeners and at stiffener or plate butts or seams. Due to the complexity and effects of groove corrosion, diminution criteria are limited and special repair considerations are needed.

Edges corrosion: Local material wastage at the free edges of plates and stiffeners. Typically, if not renewed, repairs may be carried out by means of edge stiffeners/doublers.

High resolution cameras mounted on drones are handy for detecting the above stated forms of corrosion. Corrosion is not limited to mild steel structures and piping. LNG facilities, which are primarily stainless steel and high alloy materials, the cryogenic process causes large variations of temperature (thermal cycles) thus inducing stresses related to expansion, contraction, bending and fatigue (expansion and contraction cycles). Additionally corrosion becomes a serious concern with the passage of time which includes pitting corrosion as well as stress corrosion cracking. The subtle danger with stainless steel is that the corrosion may not be recognised until the component starts leaking.

LNG steel tanks require regular inspection for bottom grouting between the outer bottom footer plate and the ring wall for any evidence of leakage or corrosion, for anchor straps for corrosion at the concrete ring wall / platform interface, and for frost spots on the outer surfaces, as these would indicate a loss of insulation performance in the annular space. Infrared imaging of the tank would detect this condition and this can be easily carried out through drone mounted IR cameras.

Surface corrosion can be easily detected but Corrosion Under Insulation (CUI) is difficult. Use of IRT (InfraRed Thermography) and capturing multi-spectral images of insulated components, the thermal signature on a portion of pipeline or vessel is identified to be different from the rest of the pipeline or vessel – an indication of anomaly and possible corrosion. By installing IRT sensors on drones it is possible to inspect those areas of the refinery or processing plant which are not easily accessible otherwise. In the absence of scheduled NDT inspections the condition of piping and fitting is largely unknown. It is a must in today's business environment to watch out for corrosion. Most rupture and leakage incidents in Oil & Gas industry are related to metal loss as a result of corrosion, mechanical creep over time or mechanical damage caused by external or internal factors. Neglect in this area leads to imposition of heavy fines and damage recovery suits. Oil spills from a storage tank or transport pipeline leakage may damage the environment.

Drone-based inspection surveys can provide resources affordably. The drones are equipped with high resolution visual cameras and IR cameras to identify surface corrosion in difficult or dangerous areas, as well as CUI detection under API – RP 583 through IRT.

Drone-based inspection solutions provide improved results in prevention as well as containment of a catastrophe while preventing the additional risk of deploying personnel for data gathering in dangerous environments.

info.industrialskyworks.com

OPTIMISING FPSO ASSETS IS A PATHWAY TO REVENUE GROWTH

Ron Beck, director of industry marketing, oil and gas, for Aspen Technology writes about how operators with floating assets can speed up revenue and first oil or gas.

A CLEAR DIFFERENTIATOR for best-in-class upstream companies is the speed to revenue from newly approved asset development programmes. Eni has made a disruptive change in their exploration and production strategy, as Eni's chief exploration officer, Luca Betelli, explained at CERAWeek 2018. They have aggressively moved to employing big data and advanced analytics to dramatically reduce the typical time to first oil or gas from five years to just 27 months.

Eni and other mega energy firms can achieve this by managing and "controlling" all aspects of the exploration, appraisal and development process. Eni keeps many of the details of their upstream digital transformation process close to the chest. On the other hand, ExxonMobil, engaged in the early stages of development of the Rovuma LNG project in Mozambique, has shared some of its groundbreaking approaches to shrinking time and cost to first gas, making two detailed presentations on its approach at the AspenTech OPTIMIZE™ 2017 conference in Houston, Texas.

So, the industry's mega firms are making some amazing strides in improving the economics of asset plays. But what about everyone else? One of the appealing approaches to developing remote assets is the

Image Credit: Eni/Flickr

Offshore Cape Three Points is a successful FPSO project for Eni.

rapidly maturing floating production storage and offloading (FPSO) model. By commissioning FPSOs, asset owners can take advantage of more modular and repeatable design approaches than those employed in conventional platform-based or on-land production. This avoids lengthy permitting processes involved in constructing production infrastructure onshore.

A typical contracting approach for FPSOs and similar floating production facilities is to outsource not only the detailed design and construction, but also the operation of these facilities.

In that model, the big open questions are how to incentivise the FPSO-contracted operator to maximise equipment reliability and uptime, and provide feedback data on equipment and process performance to improve the next design process.

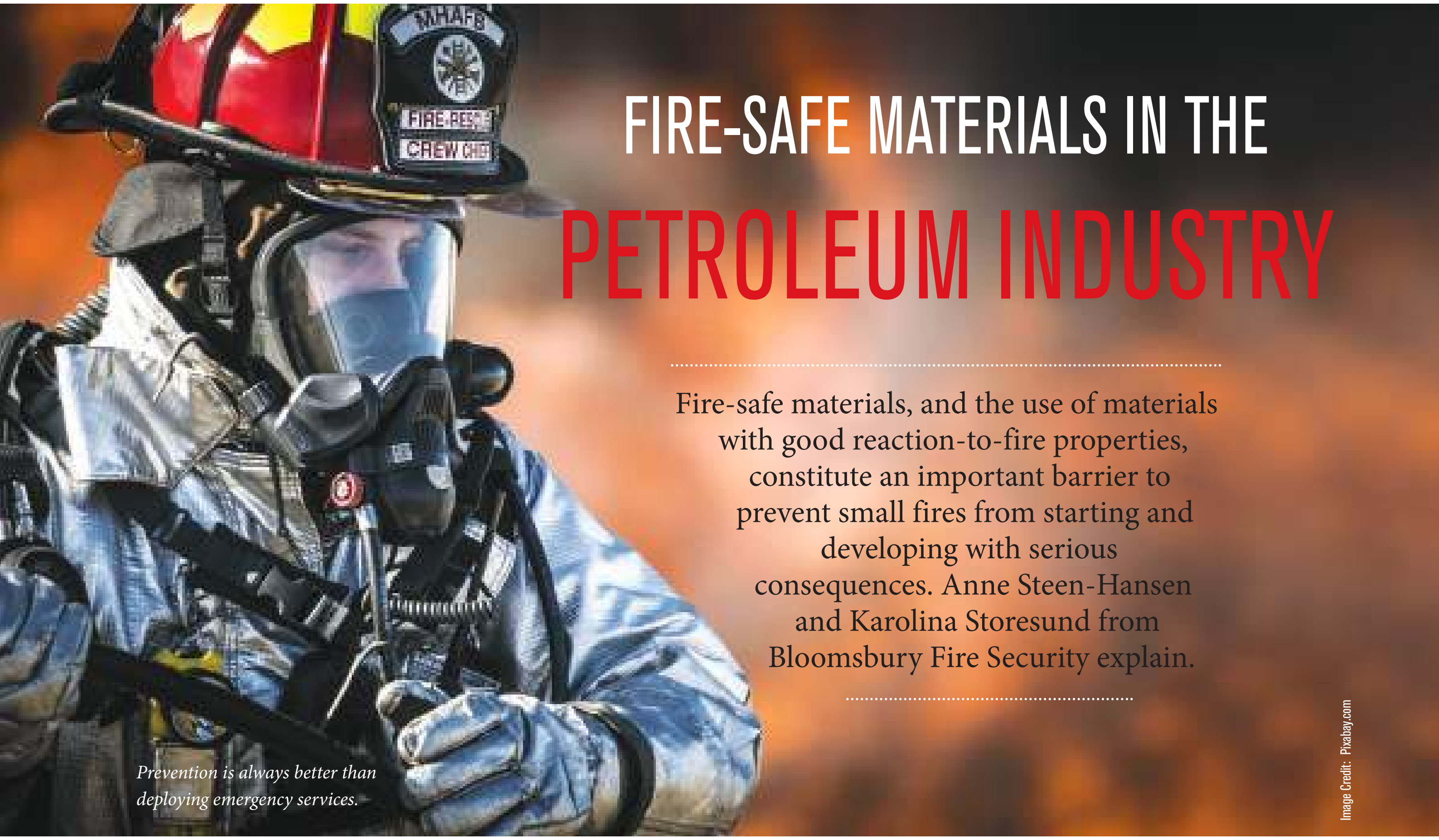
I've had opportunities to meet with leading FPSO designer-supplier companies over the past year. Many of those organisations employ AspenTech's performance engineering solution set for design and construction of FPSOs. I've been interested in working with those organisations to extend use of this design technology into the asset optimisation and asset performance management area. There are some important opportunities to use these tools, as well as companion ones, across the asset lifecycle, improving the uptime and yield of FPSO equipment and systems, as well as improving the dollar yield to the asset owner.

This is an area of strong interest at the senior executive level of these FPSO organisations. However, the contracts put in place by their clients (the asset owners) rarely give a strong incentive for the FPSO contractor to optimise performance. The costs would be borne by the contractor, while the benefits would, in many of the contracting arrangements in place today, flow to the owner.

I spoke with the relevant team at one of the asset owner companies that manages the assets that are produced through FPSO contracts. There is a clear recognition of the opportunity to improve hydrocarbon production, and therefore revenue and profit, through optimisation of the asset and reliability improvements. However, it requires revisiting existing long-term contracts.

It is crystal clear that this is an area in which senior executive attention is needed. To my mind, there is an obvious payoff to everyone if the three parties – the asset owner, the production facility contractor/operator and the optimisation technology supplier – can work together to design a business and technical solution that provides risk-reward balance between the parties and improved asset performance and reliability – and, ultimately, additional revenues for both the asset owner (through increased crude/gas revenue) and the contractor (through incentives to achieve that optimisation).

www.aspentech.com



Prevention is always better than deploying emergency services.

Image Credit: Pixabay.com

FIRE-SAFE MATERIALS IN THE PETROLEUM INDUSTRY

Fire-safe materials, and the use of materials with good reaction-to-fire properties, constitute an important barrier to prevent small fires from starting and developing with serious consequences. Anne Steen-Hansen and Karolina Storesund from Bloomsbury Fire Security explain.

CONSEQUENCES OF A fire in the petroleum industry can be very large. Fires on offshore facilities can start in several types of equipment and sites. An analysis of the 985 fires registered in the Norwegian Petroleum Safety Authority's database between 1997 and 2014 showed that approximately 67 per cent of the incidents were registered as fires or explosions that did not involve hydrocarbons. About one-third of the fires happened in the ancillary systems, which cover a wide range of functions. Six of the 985 events were categorised with the highest severity level, with a great potential for serious accident or fatalities – three of those occurred at offshore facilities. Sixty-six of the fires took place in living quarters.

This shows that serious incidents related to fires do not occur very often. However, some of the reported incidents could have developed into fires with disastrous consequences. This stresses the need for continued efforts to increase the safety and to focus on the barriers that prevent escalating events. The right choice of materials in components, construction and furnishing is an important barrier to prevent the fires from starting, and prevent small fires from developing into larger fires that will be difficult to control. The HSE regulations in the Norwegian petroleum sector are primarily performance-based. The materials used on the Norwegian continental shelf must meet the fire safety requirements given in the facilities regulations. These regulations give requirements to the performance of materials and the related guidance documents describe acceptable methods for documentation of reaction-to-fire properties.

The facilities regulations describe important principles in the selection of materials in or on plants, and the guidelines specify which test methods should be used to document the fire properties. This list of test methods has not been updated in many years, it contains several outdated methods, and several of the references do not set criteria for approval of products.

RISE Fire Research AS (former SINTEF NBL AS and SP Fire Research AS) published recommendations about how to interpret the regulations and other specifications (e.g. the NORSOK standards) in 2008, which have been frequently used within the industry. These recommendations for testing and documentation are now updated. They include references to new and updated test standards and are published in English. The recommendations can also be useful for other industrial applications of combustible materials all over the world, both for on and offshore plants.

RISE Fire Research AS is in close dialogue with industry and suppliers about the documentation, test methods and criteria to be used for installations in the North Sea. We help the parties to meet the regulations, and to maintain a satisfactory level of fire safety. It is up to operators to determine which documentation they will require for different products, based on requirements given in the facilities regulations and the NORSOK-standards. We have developed guidelines and recommendations for appropriate fire safety documentation requirements for materials covering various products and applications within the industry. The recommendations are based on an assessment of the fire risks in different areas of offshore installations, combined with our knowledge of materials' reaction-to-fire properties, as well as knowledge of how selected test methods can be used sensibly.

The report "Recommendations for the documentation of the reaction-to-fire properties of materials offshore" can be downloaded at risefr.no

IMPROVED REGULATORY COMPLIANCE BOOSTS WORKPLACE SAFETY

The offshore industry has a duty of care to the environment as well as the safety of its crew. Lee Clarke at Dynama assesses the current regulatory environment and outlines a three-point plan to educate staff and meet ever-stricter regulations.

THE 2010 DEEPWATER Horizon disaster in the Gulf of Mexico was a huge wake-up call to the offshore industry. It resulted in stricter regulation to reduce major accidents related to oil and gas operations and vastly improve health and safety for staff.

Dynama's experience of working with customers suggests that many organisations have learnt from the tragedies of the past. Crew are encouraged to live and breathe safety, even in terms of simple actions such as which side of the gangway staff walk on or holding the handrail when taking the stairs. Many companies now record and monitor every health and safety incident including if someone drops a spanner on their foot or hits their head on a beam.

The effects of major health and safety incidents go beyond lost lives: they have a devastating impact on the environment. Just as health and safety became a serious issue following Deepwater Horizon, the environment has today become a hot topic and priority for many offshore organisations, heightened, no doubt, by the prominence of issues such as climate change on the global political agenda.

As a result, improvements have been made in the way atmospheric emissions and discharges are measured, and regulators have a great deal of influence. The main challenges include the international nature of the industry which makes management of crew and resources difficult. Often a divergent set of personnel (on the payroll and contractors) along with the vessels and complex machinery they operate are scattered on-and-offshore, in different continents and in multiple time zones. Additionally, top talent is scarce and expensive.

Image Credit: Skitterphoto

Safety has to become a priority for oil and gas workers at every level of the organisation.

To meet stiff regulatory challenges, firstly, all staff need to understand what the regulations are, how they apply to their individual job roles and what their responsibilities should be. Secondly, the emphasis should be on encouraging a joined-up approach to health, safety and the environment by introducing a robust set of processes for all to follow. Finally, these processes should be wrapped up with automated technology to reduce the administrative burden, improve accuracy and aid compliance with legislation.

Three steps to stay on track

- Track your training – so many organisations waste money on a blanket approach to training that is totally unsuited to the specialist skills required. With a virtual central library of accurate staff records at your fingertips, it's easy to track what training each member of staff has had, when certificates expire and to identify then fill any gaps that come up with meaningful training.
- Most organisations have a skills matrix but to maximise its full potential, it should be integrated into planning and scheduling processes at the click of a button. This ensures that the right crew are assigned to the right projects, and skills gaps are forecast ahead of time.
- Combine the benefits of one central workforce planning solution with a sound communications strategy to keep staff informed of the latest regulatory changes as they happen. All too often, offshore projects on barges at sea can become black boxes. Avoid this by encouraging constant synchronisation of planning and crewing changes.

Acknowledge you can't always do it yourself. Take up the professional services and work with them as an extension of your own team. They often have the proven expertise to maximise, adapt and improve planning, whatever the environmental and regulatory landscape.

www.dynama.global


Prevent | Protect | Prepare

BUREAU VERITAS ISSUES NEW GUIDELINES FOR CONVERTING LNG CARRIERS

The notation FSU-LNG provides the specific classification requirements including structure and safety aspects for floating units dedicated to store LNG that are neither designed nor built to transport LNG.

Guidelines for building new floating LNG vessels, as well as conversions, are essential for avoiding potential problems.

Image Credit: Kees torn/Flickr

BUREAU VERITAS HAS issued new and updated notations and guidance to support the construction and operation of both Floating Storage and Regasification Units (FSRUs) and Floating Storage Units (FSUs).

Interest in FSRUs and FSUs is growing. Floating gas terminals offer operational flexibility, reduced timescales – from concept to operation, and cost effectiveness in comparison with onshore terminals.

Additionally, converting existing LNG carriers offers a fast route to operational availability.

There are more than 20 LNG carriers presently in laid-up condition. Many of them are candidates for conversion to floating terminal applications, such as FSRU or FSU operations.

The new conversion guidelines provide clear advice to the LNG industry in properly addressing issues that either will or may arise during the conversion of LNG carriers into FSRUs or FSUs, helping shipowners to either avoid or to overcome potential problems.

Matthieu de Tugny, COO, Bureau Veritas, Marine & Offshore said, "With growing interest in floating gas terminals, working with industry stakeholders, we are providing the rule framework and guidance necessary to develop both FSRU and FSU terminals – both for new buildings and conversions."

"Last November, Bureau Veritas (BV) published NR645, the first rules document fully dedicated to Floating Storage and Regasification Units. These new notations and guidelines are further evidence of BV's classification leadership in both FSRUs and FSUs."

The first FSRU newbuild, delivered in 2005, was to BV class; the largest FSRU ever built is MOL's BV-classed 263,000 m3 unit delivered in 2017; nearly 40 per cent of the fleet in service is BV class.

Additionally, a broad range of second party services is provided by Bureau Veritas including: risk assessment and support including tools for sloshing analysis, mooring, CFD, hydro-structural assessments and ice/structure interaction.

> **"The new conversion guidelines provide clear advice to the LNG industry to properly address issues that arise during conversion of carriers"**

OPTIMISM ABOUNDS FOR CUSTODY TRANSFER IN NIGERIA

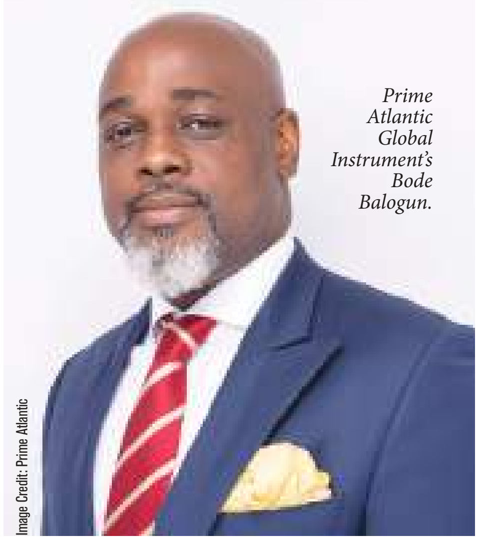


Image Credit: Prime Atlantic

Prime Atlantic Global Instrument's Bode Balogun.

Bode Balogun, deputy managing director, Prime Atlantic Global Instruments, tells *Oil Review Africa* about the company's major achievements, including being certified by the Department of Petroleum Resources for custody transfer in Nigeria.

Tell us about Prime Atlantic Global Instruments (PAGI).

PAGI, a subsidiary of Prime Atlantic Limited, is the official representative of Endress + Hauser in Nigeria. This relationship was established in 2011 to develop in-country competence, provide the retail of Endress+Hauser (E+H) products, after-sales support, customised solutions, and trainings.

Prime Atlantic Limited (PAL) is an independent, indigenous Nigerian company that provides services and solutions in the oil and gas industry. It was established in 2003 to effectively build capacity in the industry by offering the most comprehensive bouquet of solutions while subjecting its processes to the most stringent global standards. Since 2005, PAL has established formidable joint ventures with global industry leaders from Denmark, France, and the US in the areas of training, solutions, and services. Endress+Hauser is a global provider of instruments and solutions for industrial process and automation with over 60 years' experience. Our PAGI engineers have been trained by Endress+Hauser in Switzerland and are able to immediately attend to customers' requests across our region.

Tell us about your major projects.

We worked with Egbin Power, the largest power generating station in Nigeria. They were the first to install our custody transfer, gas metering and analysis solution in-country and did so using our Nigerian engineers from project origination to completion.

The end result of the project was a high-quality, fully-functional custody transfer metering solution with a gas chromatograph for quality metering and analysis at their gas inlet to the station and seven flow metering units for gas turbines. The solution not only measures the quantity and quality of gas supplied by the gas supplier but also the quantity of gas used by each turbine, thereby determining its efficiency. Ultimately, this reduces the maintenance costs.

On the Shell Bonny and Gbaran terminals, we performed full resuscitation of their tank gauging systems and instrument troubleshooting and servicing. Our work in Bonny is evidence of the increasing confidence that companies have in local capacity because despite the fact that the tank gauging equipment was installed by a foreign company, they trusted PAGI to resuscitate their tank gauging systems.

We commissioned and trained the operators of the USAN FPSO on E+H instruments. PAGI is supplying and commissioning Coriolis Flowmeters for Belema Oil's custody transfer metering skid on their recently acquired FSO.

We commenced a custody transfer, plant efficiency project for First Independent Power Limited's power generation plants, Omoku, Transamadi, and Afam which includes the supply and installation of Coriolis and Vortex flow meters as well as gas chromatographs for quality measurement and analysis of gas at their gas inlet to the station and their turbines.

What are some of PAGI's big achievements?

Our main achievement is the certification of PAGI's Endress+Hauser (Promass) Coriolis Flow Meters for Custody Transfer by the Department of Petroleum Resources . As a result of this certification, the E+H Coriolis Mass Flow Meter is the ONLY Coriolis Flow Meter approved for use of custody transfer in the Nigerian oil and gas industry. Its approval and certification by DPR is evidence of its quality, accuracy and the increasing realisation for the need of accurate and reliable metering.

This was achieved through an independent certification exercise conducted at the NEL TUV laboratory, in Kilbride, Scotland and witnessed by officials of DPR. Following the successful certification, our Endress+Hauser Promass Coriolis Flow Meter was approved for custody transfer in the Nigerian oil and gas industry.

Is the outlook of custody transfer optimistic in Nigerian oil and gas industry?

The word "custody" refers to the ownership of oil or gas. The word "transfer" refers to the change of ownership. The seller and the buyer both need to know accurately how much oil or gas is being transacted.

Nigeria as the sixth largest oil producing country in the world, has the capacity of producing an estimated 2mn bpd priced currently at $US81 per barrel. With conventional metering accuracy of ±0.35 per cent, there is a possible revenue variance of ± 7,000 barrels per day amounting to ±US$567,000 per day, which translates to ±US$207m possible revenue or loss per year for the country. Using our Custody Transfer Coriolis flowmeters with proven system accuracy of ± 0.15%, this can be reduced to ± 3,000 barrels per day, valued at ±US$243,000, leading to an extra possible revenue of ±US$119m per year for the country. With producers trying to optimise production, the inclusion of accurate custody transfer metering is a positive step in providing accuracy and transparency in terms of billing and revenue accountability for the industry and the country as a whole.

What about capacity building?

The objective of PAGI is to provide high-level services while building capacity locally by training more local engineers in the industry thereby creating opportunities for indigenes to increase expertise, marketability, and standard of living. PAGI's in-country trained engineers have successfully trained over 150 engineers and technicians from Exxon Mobil (USAN), Total, and Folawiyo Petroleum Company.

GOING WITH THE FLOW ON SUBSEA JUMPERS

Xodus regularly performs flow-induced vibration (FIV) assessments of piping systems to understand whether any vibration induced by internal flow is within acceptable levels. Sandy Hutchison, vibration engineering division manager, Xodus Group, explains.

THE INTERNAL FLOW of production fluids can give rise to low frequency excitation of piping, caused by turbulence generated by the flow disturbances or multiphase flow induced forces at bends. For example, slugging flow can cause dynamic loading and a change in self-weight for subsea jumpers with fluctuating bending stresses and fatigue damage.

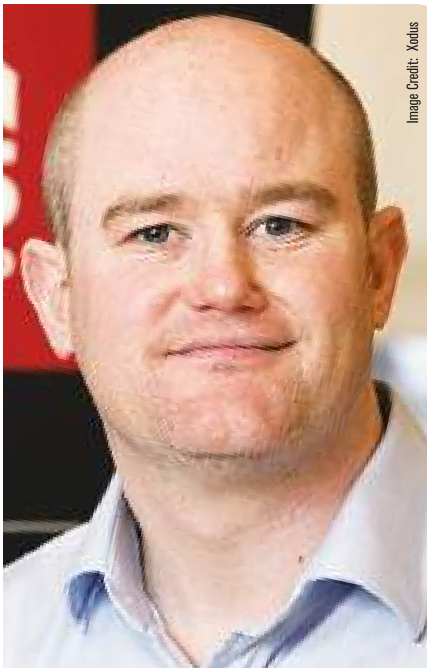
At Xodus, initial screening is based on the Energy Institute's Guidelines for the avoidance of vibration induced fatigue failure in process pipework' assessment method. This considers different operating scenarios and gives a likelihood of failure (LOF) score. The LOF is a form of scoring used for screening purposes and is not an absolute probability of failure nor an absolute measure of failure. The calculations are based on simplified models to ensure ease of application and are necessarily conservative.

In the case of FIV screening for internal pipe flow the calculations are based on the pipe diameter, pipe wall thickness and the internal fluid mixture ρU2 value. When the LOF is greater than one, the Energy Institute recommends several actions. One of which is for more detailed analysis, and this is an area of work that Xodus undertakes on behalf of clients.

More detailed analysis is performed by employing a combination of finite element (FE) methods together with computational fluid dynamics (CFD) and/or empirical forcing functions.

A fatigue life estimate is calculated using a probability density function of stress ranges based on the two slope method and S-N data for a particular class of weld.

Typically, subsea jumpers transport multiple fluid phases such as gas, water and oil.



Sandy Hutchison, Xodus.

The flow regimes and subsequent forcing functions for these are complex and there is limited understanding of their behaviour.

In 2014, a multiphase FIV joint industry project (JIP) was set up by Xodus Group and TNO. Sponsored by Aker Solutions, BP, FMC, Lundin, Shell, Statoil, Suncor, and Total, the aim of the JIP was to investigate and understand the forces induced by multiphase flow on piping systems, and generate validation data for multiphase CFD to model and analyse its occurrence on industrial scale six-inch piping.

The JIP took high quality two-phase flow induced force measurements on different bend configurations (providing empirical forcing functions for a range of flow regimes and a strong validation suite for numerical simulation) and carried out numerical simulation using CFD which compared favourably with the measurements.

An FIV assessment was performed on a typical subsea flexible jumper with a six inch diameter pipe. One end of the jumper is connected to an oil producing well via an Xmas tree and the other end to a Flowline End Termination. Different operating conditions were assessed over the production lifetime. The ends of the jumper were assumed to be fully fixed, and entrained mass (including the insulation of the jumper and surrounding water) was included in the FE model.

Initial screening results for this six inch jumper gave an LOF score of greater than 1.0 for certain production years, and the worst LOF score for any year was 2.0. Following the Energy Institute guidelines, a more detailed FIV analysis was carried out.

More detailed FIV analysis of this jumper involves building an FE model, and performing a modal analysis to assess the frequency response of the structure.

The full FIV analysis showed that the lowest fatigue life is at the welds close to the end connectors, where the maximum predicted peak-to-peak stress is, was 35 MPa. The lowest fatigue life for any production year was 160 years.

When all the production years were accumulated, the fatigue life of the jumper exceeded the design life by an order of magnitude, and so no further action was required. Although initial screening is a useful tool to highlight potential FIV issues, it should be followed up by more detailed assessment using a technique such as the one described above.

Reprinted woth kind permission from Xodus Group. www.xodusgroup.com

COMPRESSORS ARE SHAPING AFRICA'S ENERGY FUTURE

Powerful new turbo machinery and compressor technology is helping to boost Africa's emerging gas producers. Martin Clark explores the latest innovations.

AFRICA'S NEWEST OIL and gas producers are showcasing the industry's best compressor technology. One of the most recent fields to come on stream, Ghana's Offshore Cape Three Points project (OCTP), incorporates Dresser-Rand's DATUM compressors, driven by Siemens gas turbines.

Italian energy major Eni announced the start of gas production from its Sankofa field in the OCTP project at the beginning of July.

> "Operations in Ghana and Mozambique are great showcases for the latest in compressor technology for the oil and gas industry"

A BHGE compressor in use at Eni East Africa's Coral South FLNG project.

The compressors are now at work at an onshore receiving facility, providing a vital piece in a jigsaw of great strategic significance for Ghana. OCTP is the only deep offshore non-associated gas development in sub-Saharan Africa entirely destined for domestic consumption. The new field – to help guarantee reliable gas supplies – will provide 180 mn standard cubic feet per day for at least 15 years, enough to meet around half of Ghana's power generation needs.

The two Dresser-Rand DATUM centrifugal compressors – each driven by a Siemens SGT-400 gas turbine – were delivered during 2017, and are now sited at Eni's onshore gas receiving facility (ORF) near the village of Sanzule. The ORF receives the non-associated gas from the platform offshore for further compression and injection into the national gas pipeline network. As well as delivering high efficiency, power and reliability, the compressor's benefits include reduced noise and emissions, and an easier maintenance-friendly modular design. Their goal is to achieve maximum plant efficiency and deliver long-term economic benefits for Ghana.

On the other side of the continent, BHGE is supplying compressors to help Mozambique realise its own gas ambitions, a country that has discovered vast amounts of natural gas offshore in recent years. This includes involvement in pioneering floating liquefied natural gas (FLNG) work, also on behalf of Eni and its giant Coral South scheme. BHGE is supplying four turbo-compression trains for mix refrigeration services, using its aeroderivative gas turbine technology and driving its centrifugal compressors.

In addition, it will supply boil-off gas and booster compressors capable of operating at -180°C to re-liquefy any gas evaporating out of the LNG storage tanks. On FLNGs, liquefaction processes have to handle boil-off gas that evaporates from stored LNG. It is innovative work: Coral South is the first new-built FLNG facility to be installed in Africa and one of only a small number in the world. Coral South FLNG is expected to produce around five trillion cubic feet of gas during its 25 year lifespan, with start-up anticipated in 2022.

REASSESSING ARTIFICIAL LIFT WITH EVOLVING TECHNOLOGY

Artificial lift methods deployed by the industry continue to evolve with the latest technology and find their way into Africa's upstream sector. Martin Clark finds out more.

TECHNOLOGIES TO SUPPORT artificial lift continue to evolve and find their way into Africa's upstream sector. Typically that has meant the use of a mechanical device inside the well, such as an electrical submersible pumping (ESP) or velocity string, or by injecting gas into a well.

Other new technologies continue to push for solutions, such as the continuous belt transportation method, which uses an oil absorbing belt to extract from marginal wells.

The end goal is to increase the flow of liquids coming out of the well, which is especially significant in mature fields where production starts to wane, or in more complex reservoir systems.

But artificial lift systems of all shapes and sizes are routinely common. Of the approximately one million oil and gas wells producing in the world, roughly 5 per cent flow naturally, according to Schlumberger, leaving nearly all of the world's oil and gas production reliant on artificial lift operations of one kind or another. It is a vital part of the process in determining overall project economics, especially in areas such as Nigeria's marginal fields.

Reliability is essential for equipment and designs. In Gabon, Vaalco Energy had to contend with two ESP breakdowns at its Avouma 2-H well and the South Tchibala 1-HB well this past year. The pump failures temporarily halted upstream production.

The Niger Delta has a multitude of marginal oilfields where artificial lift is essential for optimising oil production.

Big industry players like Schlumberger continue to innovate in this segment, to both improve reliability and bring down costs. As well as new pump technology, last year Schlumberger introduced Lift IQ, an artificial lift management service which collects, transmits, evaluates and interprets data from wells. This aids with visualisation, real-time surveillance, diagnostics, and well and field optimisation. Weatherford unveiled its new-look Rotaflex long-stroke pumping unit that improves artificial-lift efficiency in challenging applications including deep, high-volume and high gas-to-liquids wells.

The units apply long pump strokes – up to 36.5 feet – that allow more time for fluids to enter the pump intake before being lifted to surface.

By delivering fewer strokes per barrel at a constant velocity, the design increases equipment run life, mitigates downhole failures and decreases deferred production.

BHGE introduced its Magnefficient permanent magnet motor (PMM), which enables operators to increase ESP system efficiency. This, in turn, lowers power requirements and overall lifting costs. Traditional ESP motor energy consumption accounts for up to 30 per cent of ESP system efficiency losses. The new motor delivers a higher power density, which allows operators to use a smaller motor to achieve the same horsepower levels as those achieved with an induction motor.

Indeed, power systems for artificial lift have also begun to embrace the trend toward renewable energy. That has meant the development of a solar-ESP based wellhead system for remote wellhead operations in marginal oilfields.

Similarly, the rapid spread of digital control and monitoring in Africa's energy sector has fuelled the emergence of 'intelligent' artificial lift, giving operators full exposure to a range of data for optimum performance.

This heightened visibility allows operators to get more oil out of a well and, at the same time, reduce pump energy costs and equipment breakdown.

STRENGTH THROUGH LOCAL CONTENT AND DIVERSE PROJECTS

Jude Abalaka, managing director of Tranos Contracting, talks to *Oil Review Africa* about succeeding in a challenging environment and the importance of meeting Nigerian local content requirements.

How important is meeting Nigerian local content requirements to Tranos?
As a Nigerian owned and managed company, Nigerian content is very important to us. As a result, meeting the local content requirements is a key focus. We have invested enormously in setting up a world-class manufacturing and fabrication facility, we have invested in training lots of our Nigerian engineers and technicians and we have been awarded a Nigerian Content Equipment Certificate to confirm this. We are firm believers in the ability of Nigerians to achieve great things when given the chance, and we are putting things in place to make sure we excel using Nigerian resources.

What are the biggest success stories for the oil and gas part of the business?
A big success story was the design, fabrication and testing of a subsea pipe casing for Shell Petroleum Development Company. The clamp was used for the repair of a 48-inch damaged pipeline.

Are you feeling optimistic about the economy, and how did Tranos manage during the oil price downturn?
The economy has not been as good as expected, but there are signs of improvement. We however need to see these materialise. We are a diversified technology company with customers in various sectors of the Nigerian economy, therefore a downturn in one sector will not have too much of an impact on the company as a whole.

Image Credit: Tranos

Jude Abalaka, managing director, Tranos Contracting is optimistic about the future.

> "We are firm believers in the ability of Nigerians to achieve great things when given the chance – we make sure we excel using Nigerian resources"

What exciting projects do you have coming up for the rest of 2018 and into 2019 across the different sectors in which Tranos operates?
Currently, we have a couple of projects we are working on, we have the gas generators which we are developing for the telecoms industry.

And we have our Eureka product line of switches and sockets which we will be launching in a couple of months. Tranos will be the first Nigerian company to carry out the manufacturing of switches and sockets locally.

In addition to these, we are also working on some prospective projects involving the design and fabrication of E-Houses for oil and gas companies.

Do you have any corporate social responsibility projects?
We believe in supporting things we believe, and one of these is education.

We have, at various times, supported educational institutions and groups like the Mechanical Engineering Department of the University of Lagos as well as the Lagos State University Engineering Association. We are always on the lookout for opportunities to support learning.

www.tranoscontracting.com

BLOCKCHAIN APPLICATIONS FOR THE OIL AND GAS SUPPLY CHAIN

As blockchain continues to evolve from pilot tests to real-world platforms in 2018, supply chain management is set to be transformed completely by this distributed ledger technology. Laura Brownhill from Eden Scott explains.

BLOCKCHAIN – ESSENTIALLY A distributed, digital ledger – can be used for any exchange, contracts, tracking and payment. It serves as a shared database that eliminates third parties in transaction processes and information sharing. As a result, technology, inventories, contracts, payments and data is shared directly between parties with encrypted connections.

For the oil and gas industry, commodity exchanges on blockchain can support oil and gas trading between parties anywhere in the world while removing banks, brokerage firms or other intermediaries.

Technological innovation on the operations side has become the norm for oil and gas. The same degree of innovation has not been adopted for back office functions as the industry generally has not brought much new digital technology to the supply chain, procurement, or finance aspects of the business.

However, oil and gas executives have shown a wider interest in blockchain. According to a Deloitte Consulting report in 2016, 55 per cent of oil and gas executives agree that blockchain is required to retain a competitive advantage, while 45 per cent acknowledge its disruptive potential. Last year a number of oil and gas companies, including BP and Royal Dutch Shell, announced the creation of a blockchain commodity exchange. Trading on the blockchain platform is expected to begin by the end of 2018. Further application of blockchain technology has been carried out by Diamond Offshore Drilling, who launched their Blockchain Drilling service – the first application of blockchain technology in the offshore drilling industry. This service drives efficiencies and enables operators to reduce the cost of ownership. The Deloitte report highlighted four areas to shape the discussion on blockchain in oil and gas supply chains.

Image Credit: TLC Johnson/Flickr5

Blockchain and cryptocurrency is growing in acceptance.

Transparency: Every transaction in blockchain is recorded on a block and across multiple copies of the ledger that is distributed over many computers. If any attempts are made to modify data on a blockchain, the other nodes would note that the data does not align with their own and disregard it. Thus, blockchain could increase efficiency and transparency of supply chains. But it involves standardising data between companies, storing data cost-effectively and protecting confidential information on a platform intended to be transparent. This raises the question of whether it can provide transparency for success while ensuring more efficient data and systemic security.

Security: Since every block links to the one before it and after it, there is not one central authority over the blockchain, which makes it extremely efficient and scalable. Storing data in fragments at multiple sites, rather than concentrating it one place, raises the prospect of enhanced data security even without a fully encrypted system.

Efficiency: Blockchain will provide a platform to classify all assets in a singular class. It blurs boundaries between asset classes, resulting in cash, energy products and other commodities becoming digital assets trading interoperably. More value can be derived by not restricting activity to a single asset class. Blockchain facilitates automated import/export records and notifications, including triggers for beneficial tariff programs, and helps prevent manual errors and redundant efforts.

Contracts: The sheer size and volume of contracts and transactions for capital projects in oil and gas have historically caused significant reconciliation and tracking issues among contractors, sub-contractors, and suppliers. To reduce the chaos, blockchain enables the creation of 'smart contract' – a code hosted on a blockchain that defines and executes the terms of an agreement. A standardised contract the supply chain has many benefits, such as verification, visibility, self-execution, clarity of agreement terms, fraud protection and connectivity. Removing third-party supervision and paper-based contracting cuts costs.

www.edenscott.com

PALLET SHUTTLE SYSTEMS FOR EFFECTIVE WAREHOUSING

Wasted space in warehouses can be reduced with new solutions.

MOST WAREHOUSE AND logistics operations have palletised goods stored on standard adjustable pallet racking set out with wide aisles. This offers access to every individual pallet but can mean that 50 per cent of the warehouse space is given over to empty aisles, which could be used to store product if you could only get at it. High density racking systems increase the space available without too great a compromise in product access.

Stodec Trading Ltd specialises in the design and installation of a range of these high density storage systems including the pallet shuttle system. Drive-in pallet racking with pallets supported on cantilever arms in dense blocks provides high capacity and is used widely where stock is relatively slow moving. It requires fork-lift trucks to drive into the storage lanes to deposit or pick up pallets and rear pallets can only be accessed by lifting out front pallets first. New pallet shuttle systems have revolutionised the operation and value of this type of high density installation.

The shuttle unit runs on rails installed under the pallet support arms. The fork-lift truck deposits a shuttle unit into the required lane and it is instructed from the drivers radio controlled handset to automatically carry out a range of functions, these can include lifting and carrying pallets into the storage lane, or bringing them to the front or it can perform stock control functions using barcode scanning or radio frequency identification (RFID)

Shuttle units can deal with pallet loads up to 2000kg, operate in -20ºc to +40°c, recognise and deal with different pallet sizes, and are driven by maintenance free battery packs.

www.stodec.co.uk

EFFICIENT SUPPLY CHAINS ACROSS THE CONTINENT

Paul Alexander, managing director of Storm Procurement, talks to *Oil Review Africa* about the importance of growing its business in African markets, particularly Angola, Burkina Faso, Nigeria and Ghana.

Why is the African market so important to Storm?

Our oil and gas team have extensive experience supporting both onshore and offshore operations throughout Africa. Our clients operate in some of the most remote locations and we pride ourselves in being able to deliver on time, allowing their operations to run smoothly and efficiently. One of our offices is in Johannesburg.

We also are proud of our partnerships with the UK Angola Chamber of Commerce and US Angola Chamber of Commerce, both are independent non-profit organisations promoting business opportunities between Angola and the UK and US respectively.

Paul Alexander is upbeat about the prospects for Storm Procurement across the African comtinent.

Where are the growth markets for Storm in Africa?

Our key markets for growth are oil and gas, construction, and mining, particularly in Angola, Burkina Faso, Nigeria, and Ghana. Our partnership with Grainger and Cromwell as a distributor in Africa allow us to procure competitively and internationally for local needs, although we are not limited or restricted to vendors in the products that we procure and supply.

What role does technology play in procurement?

A dedicated Storm Procurement team continuously develops advanced technologies, delivering cost savings and increased efficiencies to clients. OnePortal is the name our online integrated real-time procurement portal which, once fully developed, will allow clients to search stock, raise quotes and track KPI's. Technology plays a major role in our systems and efficiency including a dynamic enterprise resource planning tool.

> "Our clients operate in remote locations and we pride ourselves on delivering on time so their operations run smoothly"

What have been your biggest successes in Africa?

We've been supplying the Newmont Ghana operation for more than nine years. Newmont looked to us to leverage our experience, technology and resources to provide a streamlined supply chain network with advanced automated systems and international sourcing through our strategically placed offices and warehouses facilities. The challenged involved lowering the cost of overall supply chain acquisition as quickly as possible, reducing the costs associated to procurement whilst also ensuring stakeholders still received a high level of service with no impact to production. The experience of our expert teams has made this a success. What we have achieved there – and continue to achieve- has really allowed Newmont to focus its services and efficiency through-out both of its Ghana operations as well as add enhancements to the supply chain as they required.

Do you have any corporate social responsibility or charity programmes?

Absolutely. In 2016 we began an ongoing sponsorship of two school children in the Akyem Ntronang and Yaayaso Aman from communities in Ghana. The scholarship programme operates primarily in the Birim North District where the poor make up nearly 20 per cent of the population. This is an area where children have little access to education due to their poverty and there is a shortage of schools. We're committed to supporting local communities in our operating regions.

AFRICAN RIG COUNT

COUNTRY	July 2017	June 2018	July 2018	Annual change
ALGERIA	58	50	45	-13
ANGOLA	2	4	4	+2
CONGO (BRAZZAVILLE)	2	3	3	+1
EQUATORIAL GUINEA	0	0	0	N/A
GABON	1	3	4	+3
GHANA	0	1	1	+1
LIBYA	1	1	5	+4
MOZAMBIQUE	1	0	0	-1
NIGERIA	9	13	16	+7
SENEGAL	2	0	0	-2
TUNISIA	0	2	3	+3

Source: BakerHughes

3M launches Gas & Flame Detection product portfolio

3M GAS & FLAME Detection, a new product portfolio under 3M's personal safety division, has debuted its gas and flame solutions, product breadth and innovative technologies as a unified front.

The new group is formed from 3M's 2017 acquisition of Scott Safety and its Detcon, Oldham, Simtronics and GMI businesses.

"By unifying our expanded portfolio of brands into 3M Gas & Flame Detection, we're providing the POG, industrial, hazmat and commercial communities with a single source for a broad line of safety equipment, including an enhanced offering of gas and flame detection system solutions," said Mel Gerst, senior manager, 3M Gas & Flame Detection.

Within the company, 3M Gas & Flame Detection is also continuously expanding and updating its solutions such as a new infrared sensor for the OLCT 100 detector and CSA certification of the MX 32 Controller.

The Oldham OLCT 100 is a 4-20 mA analog gas transmitter designed for industrial applications in hazardous locations; it offers reduced maintenance, improved MTBF, no interference and stability in temperature variations. The operating principle is based on the reduction of infrared radiation when gas is present. There is no chemical reaction or modification to the structure of the HFO molecule. The sensor is not damaged by the continuous presence of gas or over-exposure of gas. The MX 32, a compact, low-profile gas detection controller also from Oldham, recently received certification by the Canadian Standards Association (CSA). The MX 32 can continuously monitor up to eight gas detection sensors.

Image Credit: 3M Gas & Flame Detection

3M Gas & Flame Detection products are designed for harsh environments and tough applications.

The products from 3M Gas & Flame Detection are designed for harsh environments and are user-friendly portables with large fixed selection. They keep personnel and plants safe from hazards thanks to a range of sensing technology, including electro chemical, catalytic bead, metal oxide sensor, infrared and optic solutions for gas and flame detection.

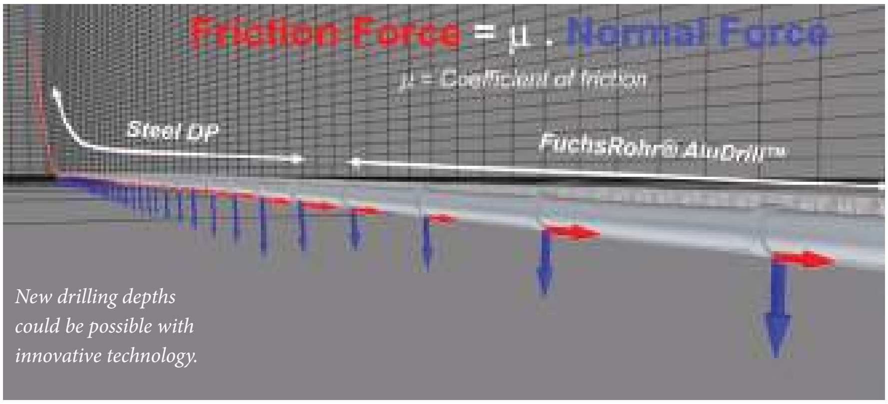
According to the company, when customers require a customised approach, 3M Gas & Flame Detection's application engineering groups help customers build the right plan for their unique hazards. A complete product line and industry-leading solutions offer quality products trusted for the most critical situations.

www.3M.com/gasdetection

Drilling technology to enhance operational efficiency in extended reach drilling

THE FUCHSROHR ALUDRILL pipe helps open up extended reach drilling into some of the world's most challenging multilateral drilling environments. As technology advances, deeper drilling operations in more challenging environments become possible. The latest record depth of almost 15km on Sakhalin island and efforts in Brazil to drill even deeper show a trend toward maximising recovery at existing reservoirs.

Tests show that the aluminum alloy pipe can deliver up to a 30 per cent reduction in torque and drag in comparison with conventional steel pipes. The specially designed aluminum alloy made with copper, silicon and other elements offers high tensile and torsional strength and an outstanding strength-to-weight ratio. The material is lighter than conventional steel pipes and has a higher buoyancy so contribution of stiffness to normal force is reduced.



New drilling depths could be possible with innovative technology.

Image Credit: Otto Fuchs

Company president Peter Kaufmann says: "FuchsRohr AluDrill pipe can extend the drilling depths of current installations and prevent cost-intensive upgrades. The pipe has a significant weight advantage, higher elasticity and a smaller bending radius than steel tubing. AluDrill pipes also manage the challenging friction forces in dog legs."

www.otto-fuchs-ds.com

ADVERTISER'S INDEX

Banco de Fomento de Angola, S.A. 60
Bureau Veritas Nigeria Ltd....2
CWC Group Ltd (9th Annual Ghana Summit 2018)....39
DMG World Media Abu Dhabi Ltd (Adipec 2018) 35
Dripro Co Limited....6
Emval Nigeria Limited 13
Exalo Drilling S.A.....18
Frontier Communications Ltd (Big Five Board Awards) 14
Global Event Partners(WAIPEC 2019) 44
Karam Safety DMCC 26
Ladol Integrated Logistics Free Zone Enterprise 21
Magnetrol International N.V.....11
Marine Platforms Ltd 5
Micropiping S.r.l. 16
NipeX (Nigerian Petroleum Exchange) 7
Nynas South Africa 41
Oldham SAS 9
Petroleum Agency SA....59
Prime Atlantic 17
Protea Oil & Gas 29
Sabin Metal Corporation....19
SGS Inspection Services Nigeria Ltd....31
Shree Steel Overseas FZCO....12
Solenta Aviation (Pty) Ltd 33
Stodec Trading Ltd 54
Storm Procurement Ltd 20
Tolmann Allied Services Company Ltd 23
Tranos Contracting Limited 37
Transnet Pipes 15

NAMIBIA: A NEW HOTBED FOR OIL AND GAS EXPLORATION

A pioneering cryptocurrency firm is calling on global investors to support an oil and gas project that could supply the energy needs of Namibia 25 times over. Samantha Payne talks to the CEO of The Aziza Project.

Will Namibia's energy needs be met through an ambitious cryptocurrency-funded project?

Image Credit: Waar was Frank?/Flickr

THE AZIZA PROJECT has set itself an ambitious US$60mn target to fund a 10-well drilling programme in the Kalahari desert for its partner, Africa New Energies (ANE).

ANE holds the rights to the 22,000 sq km asset in Kalahari – roughly the size of Djibouti – and the company is using state-of-the-art technology to explore the basin at a tenth of the cost of traditional methods.

The concession has a mean net unrisked prospective resource of 1.6bn barrels of oil, which is estimated to satisfy Namibia's 3.77 TWh energy consumption and is sufficient to turn the country into an exporter of oil and gas.

The plan is that proceeds from the onshore Kalahari asset, which has had more than 700 oil and gas seeps, would be used to develop community solar projects via a hybrid gas-to-solar strategy. This would start the electrification of Namibia as well as surrounding countries.

To kickstart the vision, the Aziza Project will be launching a cryptocurrency later this month and will be visiting the US as its first port of call to attract would-be investors.

CEO Robert Pyke said, "The heart of Aziza, a fundraising mechanism, is issuing crypto tokens where people can receive the economic benefits of owning 20 per cent of ANE. Our cryptocurrency token is an investment, which is akin to buying a share in a company. Therefore, we need to be compliant with security and regulation where our issuers and potential investors are based. We are definitely a pioneer and the next six months are going to be really critical for us. We will be in Boston in the next couple of weeks where there will be a token event for investors. In an ideal scenario, we hope our fundraising activities will be completed by Christmas."

> **"Trying to embrace leading edge technology to raise finance to support this project is very exciting – it is a compelling investment opportunity."**

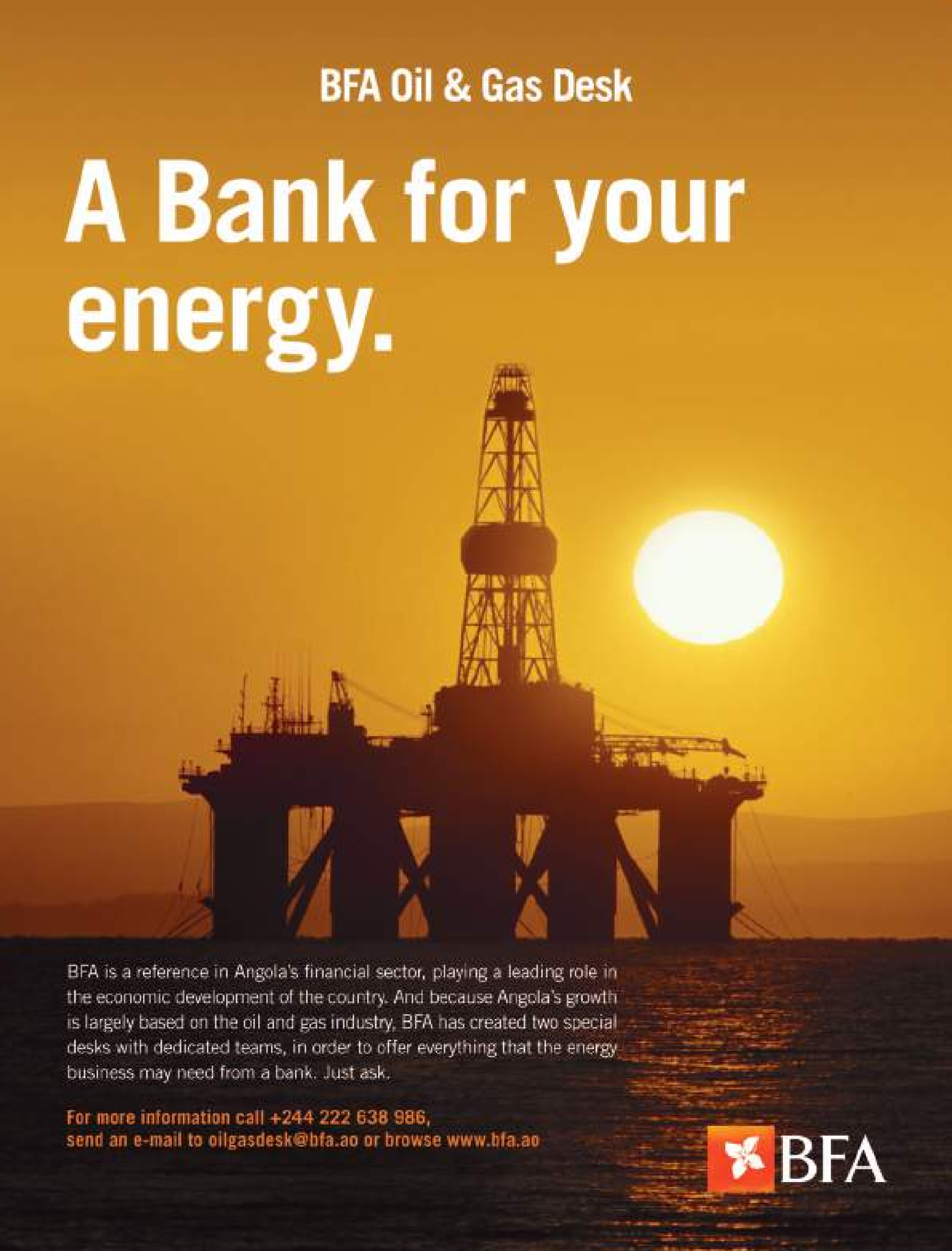
Once the Aziza Project has raised the necessary funds, ANE will be ready to start the drilling programme.

"ANE has gathered nine out of 17 layers of data, which has identified 32 anomalies that are likely to be caused by hydrocarbons. Seven of which are regarded as high quality. They know where they want to go and the process of drilling itself will give them a wealth of additional information."

Pyke added, "Trying to embrace leading edge technology to raise finance to support a project like this, is very exciting. The reason why we are doing it, instead of through conventional fundraising, is that it will be substantially cheaper and will save money both for the organisation raising the cash and the investor in the end. It is a very compelling investment opportunity."

"Things are rather dynamic at ANE at the moment," said Stephen Larkin, CEO of ANE. "We are going full steam ahead in expanding our acreage. We're looking to acquire additional blocks in Namibia, expanding our acreage in South Africa, and are seeking to expand into Botswana. We are also currently preparing the pre-drilling environmental impact assessment for Namibia as we accelerate towards spudding that first well."

The common theory is that Namibia's offshore basins are likely to be analogous to two oil rich Brazilian basins – the Santos and Campos – when the southern African country was once slotted together with Brazil some hundreds of millions of years ago. To date, however there still has not been any commercially viable oil find, but exploration continues apace and seismic data is promising.


BFA Oil & Gas Desk
A Bank for your energy.
BFA is a reference in Angola's financial sector, playing a leading role in the economic development of the country. And because Angola's growth is largely based on the oil and gas industry, BFA has created two special desks with dedicated teams, in order to offer everything that the energy business may need from a bank. Just ask.
For more information call +244 222 638 986,
send an e-mail to oilgasdesk@bfa.ao or browse www.bfa.ao
BFA