

# Petroleum Africa

August/September 2016

Continental Focus, International Reach

ISSN 1757-1383



**NOC of the Year**

**Seismic Advancements**

**Power Generation**

**African Focus**  
**Uganda & Libya**

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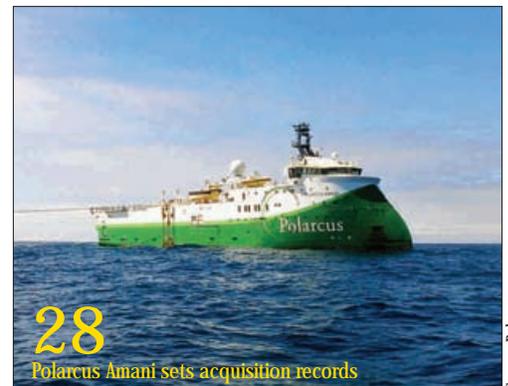
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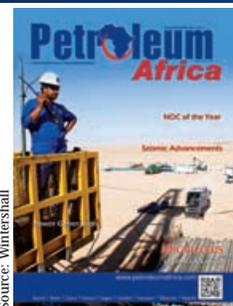
Polarcus Amani sets acquisition records

Source: Polarcus

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## ON THE COVER



Source: Wintershall

Wintershall operations in Libya in peaceful times



*Ernest Rubondo*

Ernest Rubondo was appointed executive director of the Petroleum Authority of Uganda. Rubondo previously worked with the Petroleum Exploration and Production Department (PEPD) under the Ministry of Energy and Mineral Development since its inception in 1991 and grew through the ranks to become the head of Department in 2009. In 2015 he became the Director for Petroleum in the Ministry, a position he held until this appointment.

Egypt's Minister of Petroleum and Mineral Resources, Tarek El Molla, has named the chairman of Gupco, Abed Ezz El Regal, as the new VP of EGAS. Gupco's operations GM, Nabil Salah El Din, has been promoted to chairperson of Gupco. El Molla also appointed Mustafa Taher, VP of West Bakr Petroleum for Exploration, as president of Esh El Mallaha Petroleum Co.

Rowan Companies appointed Charles L. Szews to its board of directors with immediate effect. Szews previously served as CEO of Oshkosh Corp.

Aqualis Offshore appointed Ben Lazenby as director of the company's Middle East operations from his current position as regional marine director. Lazenby succeeds Reuben Segal who will now concentrate fully on his role as COO.

Puma Energy named Alessio Torelli as Global Head of Retail. Torelli joins Puma from ENI Refining & Marketing. The company also named Andrew McClarron as Global Head of Compliance. Previously, McClarron worked at BP where he was responsible for the Ethics and Compliance program for a number of global businesses.



*Ola Fjeld*

Ola Fjeld has been appointed as a non-executive director of Aminex with immediate effect. Fjeld is currently COO of Ara Petroleum in Oman and has held positions with Geoteam, PGS, and Fugro. Aminex also revealed that Philip Thompson is standing down from the board and from his executive role in the company with immediate effect.

Prior Diesel appointed Matt Dack as business development manager. Dack has been with the company for more than 25 years, previously holding the position of service manager

SBM Offshore's Supervisory Board has nominated D.H.M. Wood as management board member and CFO. Wood will replace current CFO P.M. van Rossum who will retire after the AGM in 2017. Wood has worked at Royal Dutch Shell since 1993 in various financial and management positions, including as VP of Finance & Planning Exploration.

T.D. Williamson's board chairman and past president and CEO, Richard B. Williamson is retiring and will assume the position of chairman emeritus. He is succeeded by his brother Stephen Williamson, who has served on the board of directors since 1977 and most recently held the position of vice chairman.



*Maria da Cruz*

The US-Angola Chamber of Commerce (USACC) named Maria da Cruz president, effective immediately. As president, da Cruz will have responsibility for overseeing USACC's operations in the US and Angola. An 11-year veteran of USACC, Cruz served since 2009 as executive director in the US and previously held the position of deputy director and program assistant.

Marathon Oil promoted T. Mitch Little to executive VP, Operations. Little has held a number of subsurface and management positions across the company's operations in the US and internationally including Equatorial Guinea, Gabon, and Libya. In conjunction with this change, Cathy Krajccek, currently VP of Technology and Innovation, has accepted the role of VP, Conventional. Bruce McCullough, currently VP and CIO, has accepted the role of VP, Technology and Innovation, and retains his role as CIO. Lance Robertson, VP, Resource Plays, has elected to leave the company to pursue other opportunities. Unrelated to the organizational changes noted above, J.R. Sult, executive VP and CFO, has elected to leave the company for personal reasons. Pat Wagner has been appointed interim CFO.

2H Offshore appointed Yann Helle as managing director. Helle replaces Tim Eyles who is moving to the role of VP with parent company Acteon. He previously held the position of technical manager with the firm.



*Mutiu Sunmonu*

Sound Energy has strengthened its board with the appointment of Mutiu Sunmonu as non-executive chairman of the company. Sunmonu is the former managing director of Shell and country chairman for Shell's operations in Nigeria.

National Oilwell Varco promoted Isaac H. Joseph to President, Wellbore Technologies. Following the merger between National Oil Well and Varco in 2005, Joseph was named President of NOV Tuboscope.

Anadarko Petroleum elected David E. Constable to serve as an independent director of the company, effective immediately. Constable is the former president and CEO of Sasol.

Saipem announced it has appointed Gaetano Colucci as senior VP of Public Affairs and Communication. Colucci has many years of experience in the field of integrated institutional communications, having overseen relations with institutions and the media as well as CSR projects for numerous companies, among them Snam S.p.A., Eni S.p.A., Sintonia S.A. (Benetton Group) and Gestoredei Servizi Energetici S.p.A.

Geospatial Corp. added Todd Porter to its management team. Porter brings 30 plus years of experience and active relationships in the energy markets to the company.

Dele Alimi has been appointed MD of the new Clarion Events West Africa office (CEWA) that has opened in Lagos, Nigeria. Alimi was previously the director, Trade Promotion & International Relations, at the Lagos Chamber of Commerce & Industry in Lagos.

William E. Albrecht has been named to Halliburton's board of directors. Albrecht has more than 35 years of experience in the oil and gas industry. He previously served as VP of Occidental Petroleum Corp. from 2008 to 2014 and as President, Oxy Oil & Gas, Americas from 2012 to 2014. He also served as President - Oxy Oil & Gas, USA from 2008 to 2012.

Petra Steffen was named manager of Communications and International Key Accounts at MHS Aviation. The appointment was with immediate effect. Prior to this position she worked as marketing and public relations specialist with OHS Aviation Services.



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# MESSAGE

## FROM THE EDITOR

As my regular readers are aware, I like to get off topic once in a while and discuss other matters relating to Africa, most often sports or culture. The 2016 Summer Olympics in Rio provides a perfect opportunity. The continent was well represented not only in track & field where African nations historically have a tough contingent, but also in judo, soccer, swimming, taekwondo, and several other events.

Kenya stole the show for Africa finishing with six gold medals, and thirteen overall. Three African countries waited until the penultimate day to earn their first medals of the entire Games: Nigeria (bronze in men's soccer), Niger (silver in men's taekwondo 80kg+), and Burundi (silver in women's 800 meter). For Niger and Burundi, these are only their second Olympic medals of all time, with Niger earning a bronze back in 1972 and Burundi a gold in 1996.

Africa's Rio Medal Rankings						
RANK	COUNTRY	GOLD	SILVER	BRONZE	TOTAL	Sport
15	KENYA	6	6	1	13	All Track & Field
30	SOUTH AFRICA	2	6	2	10	Rowing, Rugby Sevens, Swimming, Track & Field
44	ETHIOPIA	1	2	5	8	All Track & Field
51	COTE D'IVOIRE	1	0	1	2	Taekwondo
62	ALGERIA	0	2	0	2	All Track & Field
69*	BURUNDI	0	1	0	1	Track & Field
69*	NIGER	0	1	0	1	Taekwondo
75*	EGYPT	0	0	3	3	Taekwondo, Weightlifting
75*	TUNISIA	0	0	3	3	Fencing, Taekwondo, Wrestling
78*	MOROCCO	0	0	1	1	Boxing
78*	NIGERIA	0	0	1	1	Soccer

\*Multiple countries tied in stated position for that ranking

Also allowed to compete from Africa with special refugee status were five athletes from South Sudan (track & field), two from the Democratic Republic of Congo (judo), and one from Ethiopia (track & field). While these athletes were afforded the opportunity to compete, the only one to advance was Yonas Kinde who finished 90<sup>th</sup> in the marathon. A number of other African nations also competed at the Rio games, Djibouti and Ghana among them, but did not finish with a medal. My congratulations goes out to all of the athletes who participated in the 2016 Summer Olympics. Medal or not, it is an extraordinary honor to represent your country on a global stage.

This issue provides an in-depth look at both Libya and Uganda; learn more about Libya's battle to get back on top and Uganda's latest plans for bringing its considerable reserves to production in our Africa Focus section. Our Downstream Focus includes a couple of articles that discuss power options in the continent, including LNG. Mark Pabst gives an insight into what is really going on in Gabon's political arena in the Oil Security article. And finally, our NOC of the Year is named in our Monthly Focus feature. As always, your comments and suggestions are welcome and can be sent to [chiefeditor@petroleumafica.com](mailto:chiefeditor@petroleumafica.com).

**Dianne Sutherland**  
Chief Editor

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# 23<sup>rd</sup> Africa Oil Week

## Africa Upstream

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## ENI Spuds Offshore Libya

ENI spud a new well offshore Libya. The Italian firm spud the C1-16/3 well on Contract Area D on July 24, according to a release on the NOC website.

Contract Area D was granted to ENI under the EPSC IV contract model signed between the company and NOC in January 2008.

The well will be drilled in a water depth of 515 feet, south of the Bahr-Essalam gas field. The well is expected to be drilled to a total depth of 10,845 feet and should be complete within 77 days.

## Zohr Estimates on the Rise

Reports have estimated reserves for ENI's super giant Zohr gas field offshore Egypt climbing. New estimates put the field at 32 Tcf of natural gas, up from the previous estimate of 30 Tcf.

ENI has begun drilling the fifth of six planned appraisal wells for the first phase of the Zohr development so reserves could potentially climb even higher.

Following the discovery of the Zohr field, ENI's CEO Claudio Descalzi said: "This historic discovery will be able to transform the energy sector of Egypt."

## Erin Progresses on Corporate and Operational Fronts

Erin Energy continued to make progress in Q2 with its balance sheet restructuring and debt reduction initiatives, according to CEO Segun Omidere in the company's Q2 report. It has successfully restructured its Zenith term loan facility and realized revenues of \$23.2 million for the quarter.

Erin's cost-reducing strategies initiated in Q1 have become deeply embedded in its operations. The company has also made the "tactical decision" to explore acquisition opportunities given the current upstream environment.

Operationally in Nigeria during Q2, the company brought the Oyo-8 well back online using a deepwater light intervention vessel and achieved net average daily oil production of 5,400 bpd, compared to 1,800 bpd in the previous quarter. Currently, Oyo-8 is producing more than 7,000 bpd.

The Oyo-7 well has not been able to come back online naturally following an emergency shut down on July 1. This is due to high water production from the well which has resulted in

a temporary production loss of about 1,400 bpd. Erin is currently attempting to bring the Oyo-7 back by introducing nitrogen from the production facilities via subsea infrastructure to the well. The company intended to carry out this nitrogen lift after its next crude lifting.

Progress on preparations for the next drilling campaign, which is planned to commence in Q4, is being made. Both the identification of a drilling rig and the procurement of long-lead well and subsea equipment are progressing.

The Oyo-9 production well is planned as an additional development well within the central area of the Oyo field in Oil Mining Lease 120 and will be tied into the existing production facilities to increase the company's production by approximately 6,000-7,000 bpd.

## New Algerian Minister Sets Focus on Gas

Algeria's newest Minister of Mines and Energy, Nouredine Bouterfa, plans to put a greater focus on the promotion of natural gas production.

Bouterfa is a downstream expert with a background in the natural gas sector stemming from his time at state-owned utility Sonelgaz (since 2004). Appointed in mid-June, Bouterfa has advocated for higher energy prices with the aim of increasing state revenues and curbing rising domestic demand in order to increase export volumes.

According to PGI Intelligence, the Minister will need to move quickly to bring about reforms in the sector and attract increased foreign interest in the gas sector. His predecessor, Salah Khebri, was given just a little over a year to attract new investment before being replaced.

## Militant Groups Continue with Attacks in Niger Delta

In southwest Nigeria, reports from local police have militants blowing up a state-owned gas pipeline.

Deputy Superintendent Olumuyiwa Adejobi, the police spokesman for Ogun state, told the Associated Press on July 14 that "hoodlums" pretending to carry out repairs planted dynamite and blew up a major gas pipeline owned by NNPC.

While no group have claimed responsibility for this act of sabotage, companies operating in the Niger Delta have been subjected to a number of attacks from the Niger Delta Avengers or the NDA. The militant group has been responsible

for cutting a significant amount of production from Nigeria's capacity.

In addition to the NDA attacks, another militant group emerged from the swamps of the Niger Delta to take up arms against oil producers, the Delta Greenland Justice Mandate. On August 10 the Delta Greenland Justice Mandate blew up a pipeline owned by NNPC and Shoreline Natural Resources.

## Dana Gas Maxes Out Capacity in Egypt

Dana Gas is continuing to rein in operational costs given the current industry crisis. Despite this effort, the company saw its revenues for H1 drop \$53 million over its revenue during the same period in 2015. The company attributes the decline to the price of crude in global markets. While its revenue dropped, Dana said this was balanced by its lower G&A and operating costs as well as investment and finance income.



Source: Dana Gas

Operationally in Egypt, the company continued its activities under the Gas Production Enhancement Agreement (GPEA). The agreement, signed in 2014, allowed the company to significantly enhance production and gradually recover its outstanding receivables in a phased manner over a three-year period going forward. To date, 17 wells have been drilled as part of GPEA with a further 12 planned over the next two years. Dana said despite a slow start, the program is advancing well.

Dana Gas Egypt delivered average production of 36,550 boepd during Q2, which is an 11% increase on the 33,000 boepd production of Q1.

Besides drilling the company completed the installation of a 17-km of pipeline in the Nile Delta region, linking the Balsam Field to the El-Wastani gas processing plant some three months ahead of schedule. This resulted in an additional production of 4,000 boepd, putting its gas processing plant at full capacity.

On the exploration end, the company is participating with BP in the drilling of the Mocha-1 well in the Nile Delta's El Matariya (Block 3) Onshore Concession Area. The well was spud in early May and is to be drilled to a targeted depth of 6,200 meters. Results from the Mocha-1 well are expected in Q4.

## Rockhopper Completes Beach Egypt Acquisition

Rockhopper Exploration completed its acquisition of Beach Petroleum (Egypt). Beach Egypt holds a 22% interest in the Abu Sennan concession and a 25% interest in the El Qa'a Plain concession.

Rockhopper acquired Beach Egypt for a cash consideration of \$11.9 million based on a cash effective date of January 1, 2016. The stakes will result in the company seeing an average working interest production rate of approximately 1,100 boepd and substantial upside potential.

Recent activity on the Abu Sennan concession includes the successful drilling of the Al Jahraa SE-1X oil exploration well which intersected 16.4 meters of net pay. The Al Jahraa SE-1X well has been cased and completed and is expected to be brought onto production imminently following signature of a new development lease. Initial estimates are that the well would add approximately 2 million boe to the gross 2P reserves recoverable from the Abu Sennan concession.

In order to complete drilling and fully evaluate the results of the Al Jahraa SE-1X well, an extension of the exploration concession has been granted to November.

In addition, the ASH-1X ST2 side track oil development well is currently being drilled with the aim of improving productivity from the ASH field.

Separate to the acquisition, Rockhopper is currently evaluating potential opportunities available through one of the licensing rounds Egyptian state-run companies are hosting in 2016.

## In Amenas to See Full Flows

Algeria's In Amenas gas plant is ready to come fully back online for the first time since militants attacked the facility three and a half years ago. All tests at the gas plant have been successfully passed and a return to full production was imminent. In Amenas is operated by Sonatrach, BP, and Statoil.

The plant is currently producing at a rate of about 16 Mmcm/d and should reach 24-25 Mmcm/d when the third and final train comes online. Forty oil workers, the majority of which were expatriates, were killed in January 2013 after al Qaeda militants attacked the plant and took dozens of workers hostage.

The In Amenas is the largest wet gas development project in Algeria. The project includes the

development of four primary gas fields in the Illizi Basin in south-eastern Algeria and the associated gas processing facility. The four primary gas fields are the Tiguentourine, Hassi Farida, Hassi Ouan Taredert, and Hassi Ouan Abecheu.

## Eastern Libya Troops to Secure Oil Fields/Clashes Possible

Troops loyal to the government in eastern Libya have made a commitment to secure major crude export terminals and fields. Abdulrazak al-Nazhuri, chief-of-staff for the leader of the eastern forces, General Khalifa Haftar's Libyan National Army (LNA), also reissued a threat to target oil tankers that do not have permission from eastern authorities to dock.

While the need to protect Libya's oil fields and ports is real, this will probably lead to a clash between the UN-backed Government of National Accord (GNA) and the government in the east, and throw a spanner in the works for getting Libya's exports back on track.

According to a *Reuters* report, the LNA has mobilized around eastern oil ports and fields.

"We will enter the ports of Zueitina and Es Sider and Ras Lanuf," Nazhuri told *Reuters* in an interview. These are the same ports that the Petroleum Facilities Guard (PFG) recently released from a blockade after coming to an agreement with the GNA.

## Egypt Approves O&G Agreements

Egypt's government has approved five oil and gas exploration agreements, according to the country's Petroleum Minister Tarek El Molla.

Four of the deals are for exploration offshore the country and were signed between EGAS and four foreign firms: BP, Edison, ENI, and Total. The fifth deal was signed between EGPC and local firm Trident Petroleum. The deal approves Trident's drilling in the Gulf of Suez.

## Front Puffin FPSO Commissioning Complete

Panoro Energy saw the commissioning of the *Front Puffin FPSO* for the Aje field offshore Nigeria completed and the FPSO is on hire following the 72-hour test. The Aje field is located on OML 113.

Targeted stabilized production rates have not yet been achieved, due to mechanical issues and Nigerian regulatory approvals. The company said that until the outstanding issues are resolved, which could take until the end of Q4 2016,

production shall be maintained at a restricted daily rate of approximately 7,000-8,000 bpd of oil.

The first lifting of crude from the *Front Puffin FPSO* were expected to take place at the end of August.

Laboratory assays have been delivered on Aje crude oil which show it to be as expected, a high quality grade of approximately 42° API. Several international oil companies and trading houses have expressed interest in purchasing Aje crude.

In addition, Panoro is continuing its planning for Aje Phase 2 (additional Cenomanian oil wells) and Phase 3 (Turonian gas and condensate), and in evaluating the wider exploration potential on OML 113.

## Sirius Sees Greenlight for Extension and Drilling Program

Sirius Petroleum extended its stay on Nigeria's OML 95. The Nigerian Ministry of Petroleum granted Sirius a renewal for the license. OML 95 contains the Ororo Field. The extension has an effective date of May 1, 2016 and is for three years. The renewal is conditional on the payment of a Renewal Fee of \$500,000 by no later than July 29.

The company also revealed that it has received firm commitments from existing shareholders to raise aggregate funds of £500,000 before expenses, to the issue of 200,000,000 new ordinary shares at an issue price of 0.25 per share. The funds being raised are being utilized specifically to pay the Renewal Fee and to progress the work on the Ororo field.



Ororo field

Source: Sirius Petroleum

The company also saw the Ministry of Environment approve its EIA for the field. The company submitted the EIA for approval in late-April in accordance with the DPR's guidelines and regulations. The greenlight covers the drilling of three wells on the Ororo Field and the installation of wellhead platforms.

## Algerian Oil Fields Increase Flows

Algeria saw its crude production increase over the past couple of months at two of its major fields, the Hassi Messaoud and the Ourhoud. Production at Hassi Messaoud is currently sitting

at 470,000 bpd, up from its previous flows of 420,000 bpd. Output at Ourhoud oil field rose 25,000 bpd to 125,000 bpd.

The North African country's Minister of Mines and Energy, Nouredine Bouterfa, told reporters that Algeria's goal was to increase production by 30% by 2020. He also revealed that Algeria has decided not to wait for a tender for exploration licenses, but would deal directly with international firms present in the country.

"We can't wait two years because we need to boost our output," Bouterfa said.

Sonatrach, the state-run oil firm, has focused on maximizing output at its mature fields. It is also looking to engage plans to drill 32 to 50 wells at Hassi Messaoud beginning this year.

## Krechba Sees Some Expats Return to Work

The Krechba gas plant, a satellite operation of Algeria's In Salah gas field, has seen some of its foreign workers return. BP and Statoil removed their foreign staff following a mortar attack in March.

While the facility was not damaged in the attack, nor anyone injured, BP and Statoil thought it prudent to remove the expatriate staff. The facility has been operational since the attack, according to Sonatrach.

It is most likely the number of expatriate staff that return to the plant full time will be lower than prior to the attack.

Statoil said none of the foreigners returning to the operation were its employees. "(After the rocket attack) we made the decision to temporarily withdraw our expats and there is no change to that," a spokesman said, according to a Reuters report. "We follow the security situation closely. It is obviously challenging."

## ROD Partners Get 10 More Years in Algeria

BHP Billiton, ENI, and Sonatrach have entered into an agreement that extends their PSC in Algeria for the Rhourde Ouled Djemma (ROD) and satellite fields in Blocks 401a/402a. The extension gives the partners an additional 10 years on the acreage.

The agreement, pending final approval, also lays the foundation for the completion of the unitization process to connect the Sif Fatima field (SF), where Sonatrach has a 100% stake, and the Sif Fatima North East (SFNE) field which is a part of the ROD Unit.

The ROD Unit consists of six satellite deposits in the Berkine Basin that pump oil back to a dedicated processing train.

## Nigeria in Talks with MEND

The Nigerian government is in talks with a former militant group that used to rampage in the Niger Delta just a few years ago. The Movement for the Emancipation of the Niger Delta, or MEND as they were more commonly known, has been holding talks with the government to try and bring about an end to the host of attacks on oil and gas facilities in the Niger Delta.

"The Movement for the Emancipation of the Niger Delta (MEND) wishes to confirm that indeed it has been in preliminary talks with the Federal Government through oil companies and law-enforcement agencies," the group said in a statement.

In 2009 MEND signed an amnesty agreement brokered by former president Goodluck Jonathan's regime in exchange for cash and job training.

The Niger Delta Avengers, the current bane of Nigeria's oil industry, is not part of the new talks. "The Federal Government made it clear during our meetings that a negotiation with criminals is out of the question," MEND said. "The Niger Delta Avengers...fall under this category."

## Protesters Block Chevron Facility in Niger Delta

Protesters in Nigeria's Niger Delta are blockading an entrance to a Chevron oil facility. The protesters are demanding jobs and housing.

"Chevron has not fulfilled many of its promises," said Collins Edema, a youth and protest leader in the Ugborodo Itsekiri community in Delta state, in a *Reuters* report. The Ugborodo Itsekiri community is home to Chevron's Escravos tank farm. Edema said the tank farm had been blocked. According to Edema Chevron had previously promised to create jobs for the youth in the area and to provide new housing.

"Our protest will continue until Chevron listens to our demands. We at Ugborodo are urging other Itsekiri communities to follow suit and shut down Chevron activities in our communities," he said.



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### Sterling Issues Surrender Notice for Ntem

Sterling Energy announced that its wholly owned subsidiary Sterling Cameroon has issued a notice of surrender in relation to the Ntem Concession, offshore Cameroon.

The surrender will be effective by the end of December 2016. The company does not expect to incur any material costs associated with the surrender.

Eskil Jersing, company CEO, said: "We are disappointed that we have been unable to reach an acceptable solution for all parties to advance operational activity on the Ntem Concession. Given the declaration of *force majeure* in May 2014, the remaining potential on the block and the challenging macro landscape, we have made the decision to formally surrender the Ntem Block. Our focus remains on securing transformative, exploitation led M&A opportunities."

### Mauritania/Senegal Fairway Could Hold 50 Tcf

In its Q2 report Kosmos Energy commented on its Teranga-1 well offshore Senegal on the Cayar Offshore Profond Block. The company announced in May that the well was a significant gas discovery, encountering 102 ft of net gas pay in good quality reservoir in the Lower Cenomanian objective.

Results from the well confirmed that a prolific inboard gas fairway extends approximately 200 km from the Marsouin-1 well in Mauritania through the Greater Tortue area on the maritime boundary to the Teranga-1 well in Senegal.

The Teranga-1 marked Kosmos' fifth consecutive successful exploration and appraisal well in this fairway in which it has discovered a gross Pmean resource of approximately 25 Tcf. The company estimates the fairway holds more than 50 Tcf of potential resources.

### Woodside Expands in Africa with ConocoPhillips' Senegal Stake

As part of its phased exit from deepwater acreage in West Africa, ConocoPhillips entered into an agreement to sell its 35% stake in three blocks offshore Senegal. The interest in the three blocks – the Rufisque Offshore, the Sangomar Offshore, and the Sangomar Deep Offshore – will go to Woodside Petroleum.

The blocks are home to the SNE and FAN discoveries. Woodside will pay ConocoPhillips \$350 million for the 35% stake. The transaction is subject to approval of the government of Senegal and co-venturer preemption rights. The

partners on the three blocks are Cairn Energy (operator) and FAR Ltd. The three offshore exploration blocks had a net carrying value of approximately \$250 million as of May 31. The transaction is anticipated to close by year-end 2016.

Matt Foxx, ConocoPhillips' executive VP, Strategy, Exploration, and Technology called the sale an "important milestone" in the company's exit from the region.

### Alba B3 Platform Sees First Flows

Marathon Oil achieved first gas production through its new Alba B3 compression platform offshore Equatorial Guinea. Production from the B3 platform allows Marathon Oil to convert approximately 130 million boe of proved undeveloped reserves, more than doubling its remaining proved developed reserve base in the West African country.



Alba B3 Topside

Execution of the Alba B3 compression project involved engineering and construction in four countries with Heerema Fabrication Group serving as the general contractor. An Equatoguinean construction firm fabricated both the platform flare and bridge structures as part of Marathon Oil's commitment to building local capacity within the country.

### Cote d'Ivoire Plans Production Boost

Cote d'Ivoire is looking to boost its oil and gas production over the next four years. According to the state-run company Petroci, the West African country will double its output by 2020.

"Today we have around 60 blocks. We've awarded about 20," Petroci's Managing Director Ibrahima Diaby told *Reuters* on the sidelines of an energy conference in the capital Yamoussoukro. "With current exploration our ambition is to reach 200,000 barrels of oil equivalent in 2020," he said.

### Gabonese Pre-Salt Stake on the Market

Companies interested in Africa's pre-salt potential and in particular, Gabon's pre-salt potential, have

a chance to gain a stake in the Tchicuate License (G13). Marathon Oil is looking for a partner to take 40% or more of its 100% stake in the Gabonese license.

The license is unexplored, but highly prospective with large pre-salt 3D PSDM defined prospects in a more oil prone, delta front play immediately outboard of proven oil fairway; combined resource potential is estimated to be in excess of one billion barrels recoverable.

The acreage is on the highly prospective margin of the largely undrilled deeper water South Gabon Basin, and located immediately outboard of the proven producing pre-salt Etame oil fields and Dussafu discoveries in shallower water. Significantly, two of the recent pre-salt exploration wells (Diaman, Leopard) in the region have found significant amounts of hydrocarbons.

The area's primary play consists of stacked lower Cretaceous pre-salt Gamba and Dentale sands, overlying source rocks including the highly organic Melania 'hot shale'. This sequence was deposited in the Dentale Paleo-Trough during the early continental break up, rifting and separation of what is now Brazil and Africa. A variety of trap-types have been identified. Upside potential exists in the post-salt Cretaceous Madiela play, which is prolific in Congo and Angola.

The Tchicuate is interpreted to contain thicker delta front sediment sequences fed from the east and ponded over the hinge zone on the trough flanks. The new CGG multi-client BroadSeis PSDM 3D seismic data over the block, processed for Marathon on an accelerated basis, provides excellent imaging in the pre-salt section.

The PSC was awarded in August 2014 and is in the first exploration period, with a well commitment prior to the end of a four-year period.

### CNR Suspends Cote d'Ivoire Investments

Cote d'Ivoire will see investments by a Canadian independent put on hold until there is an uptick in crude prices. Canadian Natural Resources (CNR) said it is postponing \$300-400 million in planned investment on its assets in the West African country.

An official from the company told *Reuters* that due to the low barrel price CNR was "obliged" to suspend operations after spending around \$1.5 billion over the past year or two on drilling new wells on the Espoir and Baobab fields to more than double production.

CNR plans to resume drilling again as soon as oil prices increase to a sustainable level and thinks it can add another 5,000-10,000 bpd to its flows from the country.

## Niger Seismic to Start Soon

A subsidiary of Savannah Petroleum signed a call-off order under its previously signed framework contract for seismic acquisition services with BGP Niger. The call-off provides for the acquisition of around 800 sq km 3D seismic data over part of the company's R3 License in southeast Niger. Mobilization of crew and equipment is expected to commence shortly.

The data acquired will provide enhanced definition over 12 existing mapped exploration targets identified on Savannah's existing 2D seismic dataset. The targets themselves incorporate stacked traps at multiple play levels (the Oligocene Upper Sokor, the Eocene Sokor Alternances and the Upper Cretaceous Yogou formations) which may be evaluated in single exploration wells. In addition, the historical application of 3D seismic in this basin clearly demonstrates that additional targets tend to be added to the portfolio through the additional coverage that the data provide.

## New Drilling Program Planned for South Lokichar

Africa Oil Corp. and Tullow Oil are planning to recommence drilling activities in the South Lokichar Basin in Q4. The initial program, on Blocks 10BB and 13T, is for four wells with the potential to extend this by a further four wells.



Source: Tullow

*South Lokichar drilling*

The first two wells will be the Etete and Erut prospects in the north of the South Lokichar Basin. Other potential prospects in the program include further appraisal of the Ngamia and Amosing fields to target un-drilled flanks, with an aim of extending the size of these existing discoveries. In addition, the JV is planning an extensive water injection test program in Q4 to collect data to optimize the field development plans.

Outside of the South Lokichar Basin, a FTG survey over Block 12A commenced to gain further data on this prospective area.

## 43 Sub-Saharan Projects on the Books Over Next Decade

While the industry may be stagnant when it comes to oil and gas projects moving forward, don't expect this to last for long, especially in sub-Saharan Africa where according to GlobalData, there are a total of 43 crude and natural gas projects expected to start operations in the next decade. Leading the charge with projects on the books are Nigeria and Angola, who have 11 and eight planned projects respectively.

Joseph Gatdula, Global Data's Senior Upstream Analyst, explains: "The region will experience investment delays across a wide scope of projects. However, developments will continue to come online in the mid-term, including fields which started development prior to the downturn in prices and those which demonstrate break evens at or below today's current oil prices."

Tullow Oil plc and Total S.A. will lead the region in terms of operatorship with five planned projects each. Of the 10 projects the two companies are expected to operate, nine are crude and one is natural gas, with Chevron Corp. occupying third place in terms of development with its three planned projects.

Key planned projects in the sub-Saharan region are expected to contribute 1.1 million bpd of global crude production in 2025 and 7.7 Bcf/d to global gas production.

These projects come with a capex of about \$153 billion, with a good chunk of that being spent in Mozambique to bring its massive natural gas reserves to market. Projects in Mozambique have a capex of around \$70 billion, with the majority of this being spent on the Rovuma Area 1 Complex and Rovuma Area 4 Complex projects.

## Uganda Selects Four Bidders to Negotiate for Oil Blocks

The winners of Uganda's licensing round launched in February of last year have been revealed. The government has invited four firms to negotiate for five PSAs, three of those firms are from Nigeria and one is from Australia.

Uganda offered up six exploration blocks in its first competitive licensing round. Bidding documents were issued to 16 companies after qualifying but only seven of those 16 submitted bids.

The Ministry of Energy and Mineral Development said it selected Nigerian firms Walter Smith Petroman Oil Ltd., Oranto Petroleum

International, Niger Delta Petroleum Resources, and Armour Energy Ltd. out of Australia.

"Negotiations for these PSAs is the final milestone before granting exploration rights," the Ministry said in a statement. Issues for negotiation would include exploration work programs and how the financial proceeds will be shared.

## Tanzania Extends Aminex's Stay on Mtwara License

Aminex confirmed that the government of Tanzania has formally approved the extension of its Mtwara License of the Ruvuma PSA. The license was due to expire in December of this year; the extension takes Aminex to December 2017.

The Mtwara License includes the Ntorya Appraisal Area where Aminex has an existing discovery. Within the license, civil work for the Ntorya-2 appraisal well has begun. The company expects the well pad to be complete within 10 weeks.

Aminex has a 75% working interest and is operator of the well. The well will be drilled about 1,500 meters southwest of the original Ntorya-1 discovery well. The drilling of the Ntorya-2 satisfies Aminex's appraisal drilling obligation, after which it plans to apply for a 25-year development license subject to its success.

## Vaalco Increases Etame Marin Stake

Vaalco Energy increased its stake in Gabon's Etame Marin Permit, acquiring Sojitz Etame Ltd.'s stake in the block. The two firms entered into a purchase and sale agreement that gives Vaalco an additional 3.23% participating stake in the acreage. The transaction has an effective date of August 1.

Vaalco is operator and prior to the acquisition owned a 30.35% participating interest in the fields in the Etame Marin block. There are four production platforms and nine wells currently producing in the concession, including three subsea well tiebacks. Production from the fields averaged about 19,000 bpd in Q2 and over 93 million barrels of oil have been produced since production commenced in 2002. This acquisition is expected to boost the company's net production by nearly 11%.

The transaction is expected to close within 90 days, subject to customary closing conditions. The company intends to fund the acquisition with the additional \$5-million loan capacity available under the new term loan agreement announced in early July with the International Finance Corporation (IFC), subject to their approval, and with cash on hand.

## Somalia Extends Odewayne PSA

Sterling Energy and Genel (operator) have had their license period for the Odewayne PSA in Somalia extended by a further two years by the government.

The expiry dates of the relevant exploration periods under the PSA have the third exploration period ending in November 2018 and the optional fourth period ending in May 2020. There is also an optional fifth and sixth period ending in May 2021 and May 2022 respectively.

The minimum work obligations for the exploration periods remain unchanged, calling for the acquisition of 500 km of 2D seismic during the third period and the acquisition of 1,000 km of 2D seismic and one exploration well during the fourth period.

## ENI and ExxonMobil Reach Deal on Mozambique

More reports on ExxonMobil joining ENI in the development of Mozambique's natural gas resources offshore the country are making the rounds. The latest report has the deal between the two being completed and ExxonMobil joining ENI on Offshore Area 4.

While neither firm would comment on the report, a *Reuters* source said that although the deal is complete it will not be officially announced at the US firm's request.

The buy into Area 4 is not the only acreage ExxonMobil will hold in Mozambique; the company was awarded three exploration blocks in Q4 2015.

ENI has been intimating for some time that it wanted to sell a portion of its stake, but it has also wanted to remain operator. CEO Claudio Descalzi told analysts that the company's model was to "remain and keep the operatorship or keep, in any case, a clear control on the asset – the asset that we discovered."

## Earthquake Limits Circle's Flows in Morocco

Circle Oil saw its production out of Morocco drop temporarily due to an earthquake that hit near the town of Kentira. According to Circle, the gas pipeline spur that the company uses to transport some of its gas from the Sebou field was closed by ONHYM, forcing Circle to reduce its flows. The pipeline was only shut in as a precaution.

Reports out of Morocco regarding the quake say there were no injuries associated with the incident. Production from the field continues through

Circle's separate pipeline system at production rates roughly 70% of previous levels.

"The reduction in gas flow rates is expected to be temporary and a further announcement will be made in due course," said Circle in a statement.

### TE-6 "Significant Discovery" for Sound

Sound Energy reported that it has made a "significant gas discovery" at the Tendirra license, onshore Morocco. The first Tendirra well, TE-6, which was drilled to a measured vertical depth of 8,743 ft, achieved a stabilized gas flow rate of 17 Mmcf/d.

According to the company the flows were significantly above initial expectations.

Sound, together with Schlumberger, is now preparing to drill a second well at Tendirra, the TE-7, using sub-horizontal drilling techniques which are expected to significantly increase the individual well flow rate in a success case. This will be followed by an extended well test. The rig-up process at TE-7 is already complete and drilling is expected to commence this month.

TE-6 will be suspended until the results of the TE-7 are confirmed, at which point Sound expects to apply for a production concession and commence detailed engineering for construction of the necessary infrastructure, which Oil & Gas Investment Fund (OGIF), one of the company's partners, has already indicated an interest in funding, constructing and operating.

## Harvest Continues to Evaluate Development Plans in Gabon

Harvest Natural Resources reported on its operations in Gabon on the Dussafu Project in its Q2 report. The third exploration phase of the Dussafu PSC expired on May 27. All expenditure commitments on this exploration phase have been completed.

While the third exploration phase expired, it did not have any effect on Harvest's discovered fields under the Exclusive Exploitation Authorization (EEA). In March 2014 the JV partners approved a resolution confirming that the discovered fields are commercial to exploit and a Declaration of Commerciality (DOC) was signed with Direction Generale Des Hydrocarbures (DGH) pertaining to four discoveries.

In July 2014 DGH awarded an EEA for the development and exploitation of certain oil discoveries on the Dussafu Project and on October 10, 2014 the field development plan was approved. The company has four years from the date of the EEA approval to begin production.

In its Q2 2016 report the company said that in order to begin production by July 2018, the current project plan being considered is to develop the area surrounding its Ruche well first, followed by the development of the other fields and drilling selected high quality exploration prospects identified on 3D seismic. Operational activities during the six months ended June 30, 2016, included continued evaluation of development plans, based on the 3D seismic data acquired in late-2013.

## Ghana Extends Erin's Stay on ESWT

Erin Energy saw its application to extend the initial exploration period for the Expanded Shallow Water Tano (ESWT) block approved by the Ghanaian government. The company now has an additional 18 months on the ESWT.

Geological and reservoir studies are ongoing with the existing 2D and 3D seismic datasets to evaluate the various possible development options and the exploration potential of the block. New 3D marine seismic data acquisition over the entire block is in the execution planning phase. The new seismic data will enable the high-grading of the exploration prospects as well as firm-up the drilling candidates.

Actual field operations await the resolution of the Ghana-Cote d'Ivoire maritime border dispute arbitration in mid-2017.

## Kenya Approves Pilot Production Scheme

Plans to produce between 2,000 and 4,000 bpd of crude in Kenya has been approved by the East African nation's government. The production will come from a pilot scheme to be initiated by Tullow Oil and Africa Oil Corp. The pilot production scheme will enable Kenya to reap early benefits from the resources discovered by the two firms.

According to a statement from the communication office of Kenyan president Uhuru Kenyatta, the country's infrastructure will be upgraded to allow the crude to travel to the port of Mombasa via trucks.

## Gambia Seismic Ready in Q3

Erin Energy revealed in its Q2 report that it is currently waiting for the completion of seismic processing in Gambia. The processing of a recently acquired 3D seismic data is expected to be completed in Q3. Erin said that once the data is in-house it expects to resume talks with potential farm-out partners.

The company's A2 and A5 blocks are located in the same prolific offshore geological basin as the recent world-class discoveries by Cairn Energy in its offshore Senegal blocks.

## ExxonMobil to Increase Ultra-low Sulfur Fuels at Beaumont

ExxonMobil plans to increase production of ultra-low sulfur fuels at its Beaumont refinery by approximately 40,000 bpd. Construction is scheduled during H2 to install a selective cat naphtha hydrofining unit, which uses a proprietary catalyst system to remove sulfur while minimizing octane loss. Startup of the flexible technology, known as SCANfining, is expected in 2018.

Gasoline produced using this technology will meet the US Environmental Protection Agency's Tier 3 gasoline sulfur specifications.

Installation of the selective cat naphtha hydrofining unit is the facility's second expansion project in a year, following the announcement of the Beaumont refinery's capacity expansion in 2015, and demonstrates ExxonMobil's long-term view and disciplined approach toward advantaged business investments. Beaumont is well positioned to competitively supply high-demand growth markets around the U.S. in the face of a challenging industry environment.

## Sasol Transports Abnormal Load

Sasol commenced the transportation of what is termed as an "abnormal load" from Johannesburg to Secunda. The company saw a 91,000 kg Acid Gas Scrubber column leave from Johannesburg as part of preparations for its annual maintenance shutdown in September.



Acid Gas Scrubber departure

The load is more than 60 meters long and was manufactured by Kelvion Thermal Solutions to replace the existing column, which has reached the end of its lifespan.

The new replacement column will be used to safely remove specific gases from the ammonia-rich stream at Sasol Synfuels' Phenosolvan plant in Secunda. Sasol Group Technology is overseeing the project.

## Uganda – Tanzania Pipeline Construction to Start in 2017

Construction of the pipeline that is to take Ugandan crude to the East African coast via

Tanzania is due to start construction in 2017. The pipeline will travel from the oil fields in the Lake Albert Basin to the Tanzanian seaport of Tanga, about 1,443 km away.

The engineering and design work is expected to begin in October, and according to Uganda's Minister of Oil, Irene Muloni, the pipeline should be operational in 2020.

The land acquisition operations, FEED study, and environmental impact study will of course be completed before work begins. Tanzania's Ministry of Energy has said the oil pipeline should be complete by 2020.

## Government to Power up Rural Tanzania

Tanzania plans to spend \$3.21 billion over the next five years to bring electricity to an estimated one million rural households in the country. The power needed to generate this electricity will use natural gas as its feedstock.

"The five-year rural electrification project whose implementation starts in this 2016/17 government financial year is expected to benefit up to 5 million people," GissimaNyamo-Hanga, acting director general of the state-run Rural Energy Agency (REA), was cited as saying in a *Reuters* report. The government will fund a good portion on its own, but it also expects to receive financial assistance from its development partners to implement the project.

The government wants to lift the proportion of the population with access to electricity to 85% by 2025.

## Kenyans to Pay More at the Pump

Kenya's Energy Regulatory Commission has increased the price motorists will pay at the pump for fuel. The energy regulator said costs were increased due to the rising price of petroleum imports.

The Energy Regulatory Commission sets the maximum retail prices for petrol, diesel and kerosene on the 15<sup>th</sup> of every month. The commission said that the cost of importing a ton of petrol had risen by 3.31%.

Petrol in Nairobi is now 95.13 shillings per liter. The commission increased the price of petrol by 8% in July.

## FortisBC Energy Gets Greenlight for Gas Pipeline

British Columbia's environmental regulator approved a natural gas pipeline to feed gas to the proposed Woodfibre LNG project. The pipeline,

being built by FortisBC Energy, may have received approval but the regulator attached some conditions to its construction.

The conditions, 30 in all, include consultation with Aboriginal groups and mitigation work to reduce impact on grizzly bear populations, among others.

The 47-km pipeline will connect to an existing pipeline in the Vancouver area and carry gas to the Woodfibre industrial site, where it would be converted into LNG for export.

Woodfibre LNG was approved by federal regulators in March. The company has not yet taken the FID on the project.

## SPDC Declares Force Majeure on Gas to NLNG

In Nigeria Shell unit SPDC has declared *force majeure* on gas supplies to the NLNG export facility on Bonny Island. The halt in feedstock supplies to NLNG is due to a leak on the Eastern Gas Gathering System (EGGS-1) pipeline.

The *force majeure* on the EGGS-1, through which SPDC supplies the bulk of its gas to NLNG, was declared on August 8 by SPDC. The declaration may impact exports from the facility.

## IPMAN and NIMEX Join Forces to Import Petroleum Products

The Independent Petroleum Marketers Association of Nigeria (IPMAN) and NIMEX Petroleum Group have entered into a partnership to import 100,000 metric tonnes of petroleum products into Nigeria as part of the government's deregulation policy.

A statement issued by IPMAN said the importation would be done by the group and it would be distributed to IPMAN's members across the country to augment the supplies received from NNPC and other sources.

The strategic relationship established with NIMEX Petroleum Group is aimed at improving the supply chain of petroleum products in the country.

## Ships Hits Wall in Panama Canal Expansion

While traversing the newly expanded Panama Canal, a Chinese container ship hit a wall. The vessel, the *Xin Fei Zhou*, was traveling through the new lane of the canal.

This was the third such incident to take place since the expansion of the canal opened. The

Panama Canal Authority said its operations team was investigating the latest incident.

The \$5.4-billion project, which was inaugurated on June 26, tripled the size of ships that can pass through the canal.

A LPG tanker, the *Lycaste Peace* also made contact with the canal. The vessel ripped off a fender during a collision in late-June, causing some minor damage to the railing of the ship, according to a source familiar with the incident cited in a *Reuters* report.

**Firms Express Interest in FSRU Tender**  
Egypt's international tender to lease a third FSRU has resulted in expressions of interest from several firms. The firms include Norway's Hoegh, US firm Exceleerate Energy and Singapore-based Norwegian gas shipping company BW Gas, according to a *Reuters* report.



FSRU Egypt

The tender for the FSRU with a capacity of 750 Mmcf/d was launched by the country's state-run firm in charge of natural gas, EGAS.

### Angola LNG Out Until Late-September

Angola LNG is scheduled to resume production in late September following a planned shutdown to test equipment. It was reported previously that the plant would only be shut-in for a few weeks and would be back up and running by mid to late August.

The plant just reopened in June after being shut down since April 2014.

### ENI Closing in on FLNG Order

Reports have a Samsung Heavy Industries-led consortium closing in on a deal with ENI that will have it building the Italian firm's FLNG vessel for offshore Mozambique. Samsung is in talks with ENI as part of a consortium with Technip and JGC for the project.

The reports of the pending order for the FLNG vessel could signal that ENI is ready to take the FID on the Mozambican project.

### Ethiopia's Mega Gas Project set to Launch Soon

Ethiopia's Foreign Minister, Tedros Adhanom, said on July 21 that initial work on the country's mega gas project would begin soon. The project revolves around taking Ethiopian gas from the Ogaden Basin via a pipeline to the coast of Djibouti.

Chinese firm GCL-POLY Petroleum Group Holdings Ltd. will finance the project which includes a gas processing.

### NOC Unhappy with PFG Deal

Libya's NOC is not happy with the deal made between the Petroleum Facilities Guards (PFG) and the unity government to reopen ports.

Libya's hopes to boost crude exports have been dealt a blow after the head of the National Oil Corporation (NOC) objected to a deal between the government and local guards to reopen key ports.

According to a letter seen by *Reuters*, NOC's chairman Mustafa Sanalla, said it was a mistake to reward Ibrahim Jathran, head of the PFG, for a blockade of the oil ports of Ras Lanuf, Es Sider, and Zueitina. Sanalla maintains that the settlement will only encourage other groups to disrupt oil and gas operations in hopes of a similar pay out. While the terms reached to end the blockade of the ports has not been made public, a *Reuters* report says the salaries for Jathran's men have been agreed upon.

Sanalla said the NOC would not lift *force majeure* at export terminals if a payout went through due to the risk that the corporation would face liabilities. Should any court cases arise internationally for losses stemming from the blockade, "we, as NOC, are determined not to be attached to these lawsuits," the letter said. NOC also threatened to withdraw its recognition of the unity government.

It is hoped that NOC, the PFG, and the unity government can come to some accord that will

allow for Libya's export terminals to once again become active.

### Cameron LNG Gets Nod from DOE for Expansion

Sempra Energy received authorization from the US Department of Energy (DOE) to export an additional 1.41 Bcf/d of natural gas from its proposed Cameron LNG liquefaction expansion project. The expansion allows for exports to countries that do not have a free-trade agreement with the US. With this order, Cameron LNG's export capacity will be 24.92 million tons per annum or 3.53 Bcf/d.

Cameron LNG received approval from the Federal Energy Regulatory Commission to site, construct and operate the proposed expansion project earlier this year. The expansion includes up to two additional LNG trains (trains No. 4 and No. 5) and one additional full containment LNG storage tank (tank No. 5).

The expansion project will be located next to the Cameron LNG terminal and liquefaction facilities that were approved for construction in 2014 in Hackberry, LA.

"Construction on the first phase of the \$10 billion Cameron LNG liquefaction project (trains No. 1-3) is currently underway. The facility is expected to commence operations during 2018, with the first full year of operations in 2019."

The proposed expansion project is subject to completing the required commercial agreements, securing all necessary consents and approvals, obtaining financing and reaching a final investment decision, among other things.

### Pertamina Shuts Refinery for Repairs

Pertamina shut its 30,000 bpd secondary gasoline refinery unit at Cilacap to conduct repairs in early August. The Residual Fluid Catalytic Cracking (RFCC) unit was expected to resume production within 10 days, said Rachmad Hardadi, Pertamina's refinery director.

The refinery shut in late July and is expected to reopen well before the end of August, according to Hardadi.



By Gary Pegg  
Managing Partner (London office)  
King & Spalding

# GAS TO POWER IN AFRICA DAWN OF A NEW DAY

*With pathfinder projects now in the pipeline, Africa's gas to power potential is starting to take shape.*

“Gas to power” is a popular and current phrase that is used as if it is a defined term or has some specific meaning or science. It does not. Nor is it a particularly novel concept insofar as many countries/regions have been using gas directly in power generation for many years. Rather, the phrase is meant to convey a trend of projects, largely focused on the African continent, which are seeking to take advantage of the coming together of a series of global events which afford a golden opportunity to address the widespread chronic power shortage particularly across sub-Saharan Africa.

Africa's power problems are well-documented. Electricity outages cost the continent billions of dollars in wasted productivity. They stifle ambitions for economic growth and diversity. Much closer to home a large proportion of the population does not even have access to power on a constant basis without resorting to portable diesel generators, or in some cases none at all. What are the series of events that have given rise to a new “gas-to-power” focus?

Africa's estimated 600-trillion plus cubic feet of natural gas reserves, is a huge resource. While export projects have been largely favored in the past, there is now a glut of natural gas globally in the wake of the US shale gas boom. So gas directly to power generation is a more attractive proposition. And for those countries in Africa without the benefit of indigenous gas there are pipeline projects to deliver gas. More relevant for this article, there is an abundance of LNG and a burgeoning market in FSRU's. There are also new innovations and technologies that are promising to take regasification to new levels and more economically.

We have seen movement in South Africa which unveiled a gas to power program a few years ago. More advanced seems to be GNPC's exciting pathfinder TEMA LNG project offshore Ghana.

## Issues in Gas to Power

Technological issues aside, there are a number of challenging commercial and legal issues in an LNG to power project.

- **Risk Allocation** – an LNG to power project, as we define it, is an integrated project starting with LNG supply to regasification facilities and ending with delivery to power producers. The contractual chain in such a project requires especial dexterity to ensure a coherent alignment of risk throughout. LNG supply throws up different challenges to pipeline gas to power. Consider the contractual chain for the TEMA project in Ghana. Under an LNG supply agreement, gas will be supplied to an FSRU owned by a third party, but chartered and operated by the project developer. LNG will be delivered to the FSRU and redelivered in gaseous form to the gas aggregator which in turn will deliver gas to power producers. And typical of most sub-Saharan African gas to power projects, some of those power producers will be government entities, others will be entirely commercial entities (IPP's), and both groups will have a different appetite for risk and different expectations for how that risk may be protected. Typical areas that need to be looked at throughout the chain are *force majeure*, change in law and tax, differentiation between political and non-political events, liability (through liquidated damages) for delays in meeting start dates, and a regime for non-performance and termination at each stage in the chain, remembering of course that failure in any part of the chain will have knock on effects throughout.
- **LNG Procurement** – LNG procurement throws up significant challenges notwithstanding the relative large availability of LNG at the moment. For some countries long lead times for development of indigenous gas reserves or pipeline construction and delivery means LNG may be regarded as more of a short term fix. Other countries

may seek to bring together a mix of LNG and pipeline/indigenous gas which on paper may seem to be a very desirable way forward. But those are complicated decisions which are underpinned by demand forecasting which involves the industrial policy and ambitions of countries that extends beyond electrification of the population as a whole. Whatever the stimulus for an LNG gas to power project, LNG has to be sourced from LNG providers who are commercially and technically reliable, but who can also meet the type of flexibility demands likely to be made by countries at different stages in their development. There are few LNG suppliers (whether portfolio or traders) who will say they cannot meet the flexibility demands required; everything is available at a cost and consequence for risk allocation and that has to be factored into the entire gas to power project as a whole. A complicated and onerous balance.

- **Credit Risk** – credit demands of LNG suppliers and offtakers, FSRU owners, charterers, IPPs and lenders all need to be factored into an integrated gas to power project. The demands for security are inevitably high, especially for LNG projects. The ability of many countries in sub-Saharan Africa to meet heavy demands for financial security, as well as maintain it for the life of the project will be a very significant challenge. It will almost certainly also be the case that the entire project will be US dollar denominated putting strains on other sectors in countries already financially challenged.
- **Other issues** – it is beyond the scope of this short article to give a complete project analysis. Issues will vary from country to country, so for some countries credit and access to US dollars will be less of an issue than others. Many countries have a well-established petroleum and regulatory framework which elsewhere may be in its infancy; environmental health and safety issues inevitably arise, and expectations from Development Agencies and the like may have an impact. Increasingly across the continent, legitimate demands from host countries for capacity building, knowledge transfer and local content require new, sometimes onerous commitments from developers and broader thinking and greater accountability than ever before.

Perhaps one of the best examples of a gas to power development which takes into account many of the above drivers, is the TEMA LNG project in Ghana being sponsored by Quantum Power. GNPC is the offtaker.



Being reliant primarily on power generated from the Akosombo Hydro facility, Ghana has been attempting to diversify its reliance on hydropower from at least the mid-1990s when the Takoradi Power Project was inaugurated by President FI Lt Jerry Rawlings. The long-term aim of Takoradi was to take advantage of natural gas sourced from Nigeria through the West African Gas Pipeline, or WAGP, (the negotiations for which took place at roughly the same time as the Takoradi development). For a number of reasons WAGP gas has not been available in quantities envisaged at the outset. Ghana has often been referred to as one of Africa's forerunners for attracting foreign investment in large part because of its stable political and legal systems, but the proliferation of back-up diesel generators will never be a substitute for allowing the country to meet its potential and ambitions. An aggressive and successful exploration campaign in Ghana however, has delivered associated gas from the Jubilee Field and will deliver non-associated gas in significant quantities from Sankofa. That said, water levels at Akosombo are low and take years to replenish, and lead times to bring on board more indigenous gas have caused the government and GNPC to focus on the import of LNG for power generations in the short term.

In an effort to bring about more coordination, GNPC was appointed the gas aggregator for the country. GNPC is currently negotiating the TEMA LNG project both as a short term answer to gas supply/electricity demand but also as an integral part of a wider infrastructure portfolio going forward. The project too will take advantage of innovative and modern technologies utilizing an FSRU located offshore with ship to ship transfer of LNG in an open ocean environment. That, and the continued development of indigenous gas reserves and greater utilization over time of existing infrastructure such as WAGP is arguably a very effective and all-encompassing example of what gas to power is really all about. 

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By Stefan Chapman  
Vice President, Euro Petroleum Consultants

# The Importance of Power Generation

Power generation provides us with electricity, which is vital to our modern way of life. Electricity is something with which we cannot do without – it runs our home appliances, it powers many processes in industry, and also powers many means of transportation. We are highly dependent on electricity.

If we look at the electricity demand around the world we see that it is rapidly increasing, notably in major developing centers such as China, Asia, and India.

This ever-increasing demand is driving the Power Generation industry – over the next few years a very significant number of grassroots power plants will need to be installed to meet these requirements.

There are several types of power plants – it depends greatly on the type of fuel used. For bulk power generation thermal, nuclear and hydro are usually favored. Each form of electricity generation has its set of strengths and weakness – there are also different considerations that need to be looked at for future power generation – notably with regards to greenhouse gas emissions.

Different regions in the world have certain preferences with regards to which type of power plant they favor. The type of power plant installed depends on many factors including location, availability of fuel, government incentives, and regulations. For example, if we compare the present situation in the United Kingdom with the one in France in terms of energy we can see important differences.

In figures 1 and 2 we can see the electricity produced for both the United Kingdom and France from all energy sources. We can see that while the United Kingdom has traditionally been dependent on thermal or fossil power stations (coal 32% & gas 30%) in France the approach has been different. Over the last few decades France has favored the

use of nuclear power plants to provide the country’s electricity. In 2014, 76% of the electricity produced came from nuclear fuel.

Let us take a look at the main types of power plants in more detail to identify the specificities of each option.

## Thermal Power Plants

Thermal power stations (or fossil fuel plants) have been by far the most conventional and traditional method of generating power with reasonably high efficiency.

These types of power plants burn carbon fuels such coal, oil or gas to generate steam – the steam is used to drive large turbines to produce the electricity.

Looking at the relative strengths and weaknesses – reliability: these types of plants can generate electricity reliably over a long period. However, as mentioned previously, in this day and age the fact that the power is generated from burning carbon fuels is proving to be an important problem – notably with regards to carbon dioxide emissions and sulphurous oxides.

Another possible concern with regards to fossil fuel plants is the need for very significant quantities of coal, oil or gas for feedstock. In some cases these fuels have to be transported over long distances and there is also the issue of price increase in times of shortage, meaning possible fluctuations in generation costs.

## Nuclear Power Plants

Nuclear Power plants produce reliable supplies of electricity, with very low carbon emissions and relatively small amounts of waste, but due to the nature of the process this waste needs to be safely stored and eventually disposed of.

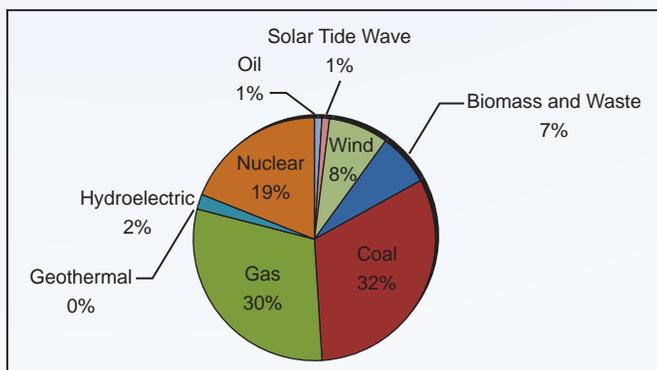


Figure 1: UK – Electricity Production from all Energy Sources 2014 (%)

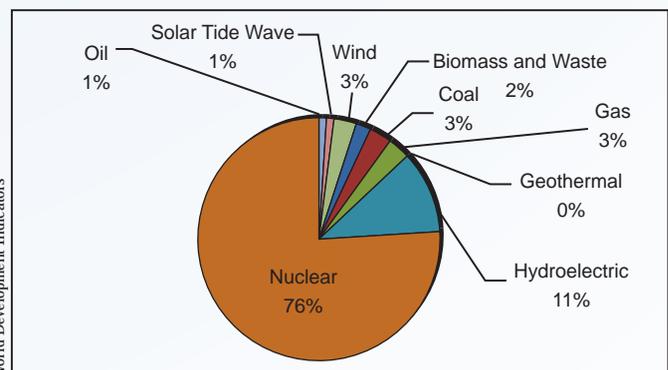


Figure 2: France – Electricity Production from all Energy Sources 2014 (%)

All figures are courtesy of The World Bank, World Development Indicators

These plants are similar in many aspects to the thermal (or fossil) power plants – both produce steam, which is in turn used to power turbines producing the electricity. The main differences are the use of radioactive material as a fuel instead of coal, oil or gas, the use of nuclear reactor and exchangers instead of the furnace and boiler.

The process uses the heat produced by nuclear fission to generate steam that drives turbines. There is in this case no greenhouse gases produced, and only small amounts are produced across the whole fuel cycle.

Production reliability is also very important and in this aspect nuclear power plants can run for many months without interruption, providing reliable and predictable supplies of electricity.

### Hydro-Electric Power Station

Our third major producer of electric power is hydroelectric power plants. These plants generate electricity by storing water in reservoirs behind massive dams. The electricity is produced when the energy generated by the water flowing from the dam is channeled through turbines, hence generating electricity. The water then runs out into the rivers below the dam.

Hydro dams have the potential to generate large amounts of electricity. There are however a number of potential disadvantages including the weather impacting the water level in the reservoir, and the potential impact on the local ecology by modifying the natural flow of the water.

### Electricity from Renewables

As mentioned earlier the majority of world's electricity has historically been produced from three different types of power plants: thermal or fossil, nuclear and hydro.

This picture is evolving with environmental awareness becoming a major part of our daily lives – this has meant that there has been a conscious effort to increase the share of electricity produced from renewable energy.

Sources of renewable energy including wind, solar and small-scale hydro produce electricity with a 'clean' process emitting very low amounts of greenhouse gas emissions across their entire lifecycle.

In the past the cost of generating electricity from renewables has proven to be a stumbling block when compared to cost of power production by 'traditional' processes – however these costs are now coming down.

In terms of reliability, there remains some concern as these processes are often dependent on factors that are difficult to predict or harness, such as production output fluctuations due to wind speed or strength of sunshine, etc.

This has meant that in some cases the renewables are backed up by other forms of power generation including fossil fuel generation processes.

### Circulating Fluidized Bed Boilers

There is another sector that is interesting to focus on and that is the Circulating Fluidized Bed Boilers (CFB) – these advances in technology and processes have enabled boiler and power plant operators a greater flexibility in burning a wide range of coal and other fuels. All this without impacting efficiency and more importantly with reduced pollution.

One major opportunity that CFB's can provide is that it can be used to burn Coke or pitch from Solvent Deasphalting units (SDA) as the fuel. This can be a good solution to achieve 100% conversion in refineries – zero waste refineries.

The energy sector is currently focusing on increasing the power output of various CFB boilers and at the same time reducing emissions.

The Asia Pacific region has provided a number of opportunities for CFB boilers due to the high demand for industrial and infrastructural developments – these industries have important energy requirements and this trend is likely to continue in the coming years – meaning a significant market growth for CFB boilers.

With the rising environmental concerns and implementation of stringent emission control norms, the CFB technology will provide an interesting option for power generation in terms of reducing impact on the environment.

There is also the added advantage that CFB boilers have low running cost, higher reliability, and better fuel flexibility.

However it is not only positive news with the high maintenance cost of a CFB boiler as its most notable drawback. These types of boilers operate under extreme conditions experiencing oxidation, heat, and at a higher rate than their subcritical counterparts. This means a higher risk of rusting and thus quicker erosion of reactor walls.

### Cleaner, More Efficient Power Generation

So why do we need a cleaner, more efficient power generation industry?

The simple answer is that we have seen that the risks of carbon pollution on the environment, our way of living and our health. There is now a conscious effort to minimize carbon pollution from power plants.

As mentioned, there have been technological advances to reduce the emissions from power plants, there has been the use of alternative fuels as well as different types of power generation plants. The common goal is to have a reliable energy system, while minimizing pollution and protecting our health and environment now and for future generations. 

#### About the Author

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# Power Generation in Africa

# M Z A M B I Q U E

## A CASE STUDY

Although Mozambique has definitely found itself sitting on a significant amount of natural gas, the proposed development of these resources goes far beyond the export of gas to foreign, more developed markets. In fact, the government of Mozambique has realized that the gas discoveries in the Rovuma Basin are a game changer with the potential to take the country to a whole new level of economical and industrial development. Development – and not only in terms of revenue – appears to be the main driver of the country’s policy to exploit the Rovuma gas, and the government has sought to approach this issue in an integrated manner, and developed a document that lays down the strategies and the priorities for the use of natural gas in the country: the Natural Gas Master Plan.

### The Natural Gas Master Plan

In addition to LNG – the obvious priority to start generating cash flow for the State coffers – power generation is seen as pivotal for the country’s development strategy. Small and medium (gas fired) power plants and large combined cycle plants are being considered. Having reliable power available is, of course, crucial for industrial development and this is regarded as a priority by the government. Additionally, there is a large regional market (organized around the Southern African Power Pool) that can also play an important role in using the gas for power generation.

The Natural Gas Master Plan, approved by the Council of Ministers in 2014, aims to be a strategic guiding instrument for the national use of natural gas, in order to ensure the most effective and advantageous benefits thereof for the country and its population, and to promote its sustainable development.

According to the Natural Gas Master Plan, the natural gas market can be divided into three major sectors: (i) use of natural gas for power generation; (ii) large industrial consumers; and (iii) small and medium enterprises.

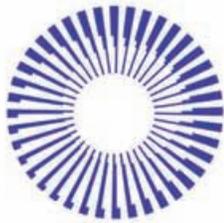
The Natural Gas Master Plan states that the use of natural gas for power generation is of particular importance as the supply of electricity with good quality and adequate safety levels is a basic need for the development of any project, regardless of its size.



On the other hand, the large industrial consumers sector would typically fall under the “mega-projects” legislation due the investment amounts involved. Large industrial consumers use gas as a feedstock for the production of fertilizers (urea), methanol and liquefied gases, or in manufacturing processes for heating, electricity, aluminum smelting, steel mills, petrochemical plants, refining, etc.

In turn, small and medium scale enterprises, which tend to be located in urban areas, employ gas for industrial and commercial use in small

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quantities, mainly for process heating, drying, cooking, etc. This sector also includes use in road transport.

Additionally, the Mozambican government considers that it is necessary to ensure that part of the natural gas being produced in the Rovuma Basin (which holds most of the gas resources discovered in the country) is used for the industrialization of Mozambique at a price that allows the viability and competitiveness of the industries to be created.

According to the Natural Gas Master Plan, in order to ensure the sustainability of the exploitation of Mozambique's natural gas resources, the government has been perfecting the institutional, political and legal frameworks applicable to the energy sector.

### Institutional Framework

There are several bodies currently responsible for regulating oil and gas activities in Mozambique.

The Ministry of Mineral Resources (MIREM) is the government's institution responsible for promoting sustainable use of natural gas in the country. MIREM develops and implements policies relating to the exploration and production of mineral resources, including hydrocarbons. In addition, the National Petroleum Institute (INP) regulates and oversees all upstream oil & gas related activities.

On the other hand, Empresa Nacional de Hidrocarbonetos (ENH), the national oil company is the entity responsible for participating in the prospecting, exploration, production and trading of petroleum products and represents the State in petroleum operations.

Moreover, there are many ministries that may also play a key role in the sustainable use of natural gas for power generation and gas use, such as the Ministry of Energy (which is responsible for the regulation of downstream production and distribution operations), Ministry of Trade and Industry, Ministry for Coordination of Environmental Affairs, Ministry of Planning and Development, and Ministry of Finance, among others.

### Policy Framework

Over the years, the Mozambican government has adopted several policies in order to promote the development and sustainable use of the country's energy resources. A few key examples include the Energy Policy, the Strategy for the Development of the Natural Gas Market in Mozambique and the country's Energy Strategy.

The Strategy for the Development of the Natural Gas Market in Mozambique, which was approved by Resolution No. 64/2009, of November 2, 2009 aims to maximize benefits of natural gas for Mozambique, reduce imports and preserve the environment. According to this strategy there are two potential uses for natural gas in Mozambique: (i) use of gas as fuel; and (ii) use of gas in major projects.

The strategy states that natural gas may compete with the majority of fuels used in the industry or for the generation of electricity in areas

close to pipelines. On the other hand, it also states that if new discoveries of natural gas are made, there are projects which require high amounts of natural gas that may eventually become attractive for implementation in Mozambique such as (i) the production of ammonia and fertilizers; (ii) methanol production; (iii) iron and steel; (iv) production liquid fuels (GTL – Gas to Liquids); (v) production of liquefied natural gas (LNG) for export and/or transport to other places along the coast of Mozambique.

In addition, the Energy Strategy was approved by Resolution No. 10/2009, of June 4, 2009 and aims to ensure the availability of power in Mozambique and meet the challenges posed for the sustainable socio-economic development of the country.

The Energy Strategy proposes the continuation and acceleration of the country's electrification efforts, prioritizing rural areas through the Expansion of the National Network of Energy Transport (RNET – Rede Nacional de Transporte de Energia) and alternative energy sources, including by the use of low cost solutions and the reinforcement of the collaboration between institutions such as the State-owned utility, Electricity of Mozambique (EDM – Electricidade de Moçambique) and the Energy Fund (FUNAE – Fundo de Energia), as well as the introduction of a percentage value in the investment packages in order to finance equipment and electrical goods capable of stimulating the productive and efficient use of energy (for instance, low cost and high efficiency bulbs).

This strategy also states that it is crucial to ensure the fulfilment of Mozambique's electricity needs by implementing major power generation projects. According to the strategy, electrical energy must be valued internally before its export is considered. This will avoid situations similar to the Cahora-Bassa dam, which exports most of the energy produced, when the country has a clear energy deficit.

In turn, the Energy Policy, which was approved by Resolution No. 5/98, of March 3, 1998 establishes several objectives such as (i) to ensure a reliable supply of energy with the lowest possible cost in order to fulfil the current energy consumption and the economic development needs; (ii) increase the availability of energy for the domestic sector, especially mineral coal, lamp oil, gas and electricity; (iii) export of energy products; (iii) improve the efficiency of energy use; (iii) institutional development; (iv) creation and review of legislation applicable to the energy, electricity and petroleum sectors.

The policy also states that the government of Mozambique aims to extend the national electricity network in order to improve the living conditions of the Mozambican population, providing a reliable technical service with costs that are compatible with the economic needs as well as the increase of exports.

### Legal Framework

Law No. 21/97, of October 1, 1997 (Electricity Law) applies to production, transport, distribution and trading of electricity in

In terms of powers and attributions, the Council of Ministers is responsible for the award of concessions with an installed nominal capacity equal to or higher than 100 MVA, while the Minister supervising the energy sector is responsible for those between 1 MVA and 100 MVA.

Mozambique, as well as its import and export, into or from the country. The statute sets out the key provisions to be included in concession contracts that are awarded for the development of power projects. The Electricity Law establishes that the State, its institutions or other public legal persons, have a leading role in promoting the enhancement of existing capabilities, to enable an increasingly wider access to the benefits of electricity, and contribute to the economic and social development of the country and the region. Importantly, it also acknowledges the role of the private sector in the public power utilities sector.

Private investors (including international investors) wishing to enter the power sector in Mozambique may apply for the negotiation and entering into of a concession contract, foreseeing the terms and conditions applicable to the project. However, in order to encourage competition, a public tender may be organized for such purpose. Under the law the concessions may have a term of up to 25 years (except in the case of hydro power projects, where the maximum term is 50 years), renewable, thus giving investors sufficient time to recoup their investment and make an adequate return. Freedom of access to existing infrastructure (for instance transmission infrastructure) is also guaranteed, upon payment of non-discriminatory fees. As for the national transmission network, it is currently being operated by EDM, the Mozambican State-owned utility.

In terms of powers and attributions, the Council of Ministers is responsible for the award of concessions with an installed nominal capacity equal to or higher than 100 MVA, while the Minister supervising the energy sector is responsible for those between 1 MVA and 100 MVA. A regulatory agency, the National Electricity Council (*Conselho Nacional de Electricidade*), was also created under the Electricity Law and ancillary regulations, with wide powers in terms of supervision and organization of the sector.

### Conclusion

The major gas discoveries in Mozambique, especially in the Rovuma Basin, have the potential to make an important contribution to national development. However, in order to ensure the country's economic and industrial development, it is crucial that the Mozambican government ensures that there is reliable power available in the country and strikes the right balance between the amounts of natural gas exported and the quantities retained for power production.

The Natural Gas Master Plan seems to be a step in the right direction as it clearly indicates that having reliable power available in Mozambique and the country's economic and industrial development is regarded as a priority by the government. This said, the possibility of attracting world class players to the market will depend on certain factors that are, at least in part, within the powers of the government. Among other factors, the gas sales price, approval of a contractual framework

capable of contributing stability for investors, and the negotiation and entering into of adequate power purchase agreements that give investors certainty of recovering their investment is crucial to ensure the success of power projects. 

### About the Authors

*\*Ricardo is a Partner at Miranda & Associados' Lisbon headquarters, and is responsible for coordinating the firm's Timor-Leste office. He is Co-Head of the Firm's Energy and Natural Resources Practice Group and frequently advises energy companies in setting up and carrying out their operations in Africa and South East Asia. Edna is a trainee and a member of the Energy and Natural Resources Practice Group at Miranda & Associados.*

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# GABON

## The Price of Stability

For over 40 years Omar Bongo ruled Gabon through a combination of fear, political guile, and generosity to allies and potential allies. While his less than democratic methods won him his share of critics in the international community, he was generally tolerated and often actively embraced by the leadership of countries like France, the former colonial power in Gabon, the United Kingdom, and the United States. French President Charles de Gaulle is said to have essentially chosen Bongo to lead Gabon.

One reason these powers remained positively inclined towards the long serving leader is because he generally brought stability to an oil-rich corner of Africa. Though Gabon's relative importance to oil markets has decreased as more African countries have become oil exporters, the country still holds the third largest proven oil reserves in sub-Saharan Africa. In fact, the only time outside powers pressured him to increase the people's say in Gabonese government affairs was when protesters agitating for more democracy threatened the peace. When Bongo *père* died in 2009, few outside Gabon protested when his son Ali Bongo won the election to fill his father's office. In fact, French President Nicolas Sarkozy was among the first to call and congratulate Bongo *filson* on his victory.

That is not to say the younger Bongo's opponents took his ascension lying down. There were civil disturbances and accusations of election fraud following his win. However, Ali Bongo largely shrugged these off, managed to avoid global headlines for the rest of his first term, and seemed confident going into his second presidential election this August. However, the protests sparked by the younger Bongo's questionable "reelection" in the 2016 polls have some of the Bongo clan's erstwhile international allies abandoning the president. One reason is the level of violence associated with the protests against Bongo this time around. Protesters set fire to the parliament building in the capital Libreville and repeatedly clashed with security forces in the days immediately following the election. According to news outlets, over



Source: UN photo # 91562



Source: UN photo # 562510

*The late Gabonese president Omar Bongo Ondimba (left) and his son Ali Bongo Ondimba (right), now current president*

800 protesters were arrested, and the opposition says as many as a 100 more were killed by police. For its part the government put the number of dead protesters in the single digits.

The other reason is the blatant nature of the election fraud committed in favor of Bongo in the most recent election. The president tallied fewer than 6,000 votes more than his main challenger Jean Ping, an especially close result in a country of 1.8 million. Election returns from the Bongo stronghold of Haut Ogoue were several hours late and showed voter participation of over 99%, with 95% of votes in the region going for Bongo. Given that national turnout averaged around 60%, the returns from Haut Ogoue seem especially suspicious.

Election returns from the Bongo stronghold of Haut Ogoue were several hours late and showed voter participation of over 99%, with 95% of votes in the region going for Bongo. Given that national turnout averaged around 60%, the returns from Haut Ogoue seem especially suspicious.

While other strongmen who sit on large oil reserves have benefitted from similar voting patterns (Equatorial Guinea's President Teodoro Obiang Nguema reportedly received 103% of the vote in one province in his country's 2002 elections), former allies, domestic and international, appear ready to challenge Bongo over the latest election results. Gabon's Justice Minister Seraphin Moundounga resigned in early September when it became obvious the government would not heed protesters' calls for a recount. Moundounga told *Radio France Internationale* that he was stepping down because he believed "the government was not responding to concerns about the need for peace and the consolidation of democracy."

Source: European Parliament



*Mariya Gabriel head of the European Union's mission in Gabon*

Among international observers, the head of the European Union's mission in Gabon, Mariya Gabriel, called for the government to publish the poll results by individual polling station, and noted that failure to do so would result in "a crisis of confidence in the (election) results." French Prime Minister Manuel Valls also discussed a recount, but hedged by saying "common sense would command a recount... but our priority is the safety of the 15,000 French nationals who live and work in Gabon." While not exactly a call

for Bongo's ouster, it is a far cry from the congratulations offered by Sarkozy after the last elections.

So what is the difference between the contested elections that brought Ali Bongo to power in 2009 and the most recent polls in August? For one, the overall economic backdrop. The plunge in oil prices over the last year has been particularly tough on Gabon. The country has gone from a budget surplus in 2014 to a deficit today. Increased spending associated with Gabon's decision to host the African Cup of Nations next year suggests the deficits will likely continue for the foreseeable future. To be fair to Bongo, his government has had some success replacing lost oil revenue with increasing levels of foreign direct investment. In 2008 oil accounted for half of Gabon's GDP, and now it accounts for about a third of total GDP. While some of the rebalancing can be attributed to falling oil prices, much of it is a testament to Gabon's increasing ability to attract investment, which makes the current unrest all the more unpalatable.

Foreign powers are starting to criticize Bongo when he needs them the most. When oil prices are high, the world is more willing to turn a blind eye to less egregious signs of authoritarianism because it needs Gabonese oil. At the same time, a flush Gabonese government is less dependent on foreign investment and loans from abroad. Now, however, Bongo is in a situation where he needs to show investors that Gabon is stable enough to lure investment and at the same time worthy of IMF loans to fill the growing hole in the national budget. In short, the latest problems are coming at exactly the worst time for Bongo.

Ironically, the crisis is partially due to Bongo's desire to be seen as a legitimate leader. He allowed the opposition relatively free reign to criticize him during the campaign, with Ping even going so far as to claim Bongo was not really Gabonese (similar to businessman and now current US republican presidential nominee Donald Trump's efforts against the 2008 Democratic nominee and now president Barack Obama). It is certainly difficult to imagine leaders like Equatorial Guinea's Obiang putting up with similar accusations. Moreover, he either was unable or unwilling to orchestrate the widespread voter fraud necessary to guarantee himself the type of comfortable victory enjoyed by presidents of oil rich countries that share Gabon's neighborhood. Now Bongo, assuming he survives this crisis, has to deal with a reputation as an authoritarian. If Bongo does manage to hold onto power, foreign governments, companies, and investors will also have a decision to make. How much support are they willing to give a man that will now have the reputation of being a dictator? **P**

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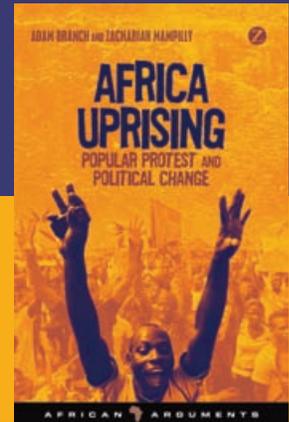
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# Africa Uprising

## Popular Protest and Political Change

By Adam Branch and Zachariah Mampilly  
Zed Books  
2015



Popular uprisings in Africa have been in the news recently, especially the ongoing protests in Ethiopia. According to Human Rights Watch over 400 people have been killed in Ethiopia protesting the government's plans to reallocate land belonging largely to members of the Oromo ethnic group, but it wasn't the killings that garnered the world's attention. Instead it was the decision of Ethiopian runner (and ethnic Oromo) Feyisa Lilesa to put his hands above his head in an "X" as he crossed the finish line to win a silver medal at the Olympic marathon in Rio. The gesture is one associated with the protests, and after he made it many speculated that Lilesa was now a man marked for discipline, or even death by the government in Addis Ababa.

However, the protests rocking Ethiopia are far from the only ones happening in Africa currently. In South Africa people recently took to the streets to urge President Jacob Zuma to step down after his party's recent humiliating election losses, and Zimbabwean President Robert Mugabe attempted to ban protests in the capital Harare after a restive August. In Gabon an estimated 100 protestors were killed in August protesting the results of the presidential election.

Adam Branch and Zachariah Mampilly, the authors of one of the latest books in Zed Books' "African Arguments" series, believe that many of these popular uprisings are too often overlooked. In fact, they think that popular protest has become common enough in Africa that it has earned a spot in the continent's overall narrative. While economics journals and business magazines have been busy touting Africa's rising fortunes in recent years, the world has largely ignored the popular uprisings that have mushroomed throughout the region over the same period. According to Branch and Mampilly "perhaps we need to abandon the simplistic narrative of Africa Rising and instead focus on Africa's *Uprisings*." Hence the name of their latest effort, "Africa Uprising: Popular Protest and Political Change."

While economics journals and business magazines have been busy touting Africa's rising fortunes in recent years, the world has largely ignored the popular uprisings that have mushroomed throughout the region over the same period.

They back up their argument about the ubiquity of protests with a table that lists the many popular uprisings that have rocked no fewer than 40 African countries since 2005. In making their list they were careful to exclude things like labor strikes for improved wages, student protests focused on campus living conditions, and ethnic protests that sought benefits for a particular tribe or community. Even with these limits, the list is impressive.

Casual observers are unlikely to be familiar with many of these protest movements outside of the Arab Spring, which obviously garnered widespread attention. This could be because in the last decade popular uprisings that have occurred across the continent have often been dismissed as protests against economic conditions or simply "food riots." Branch and Mampilly quote one scholar who tries to put the notion of food riots into perspective, saying that "although (these) demonstrations and riots were sometimes precipitated by food price rises, the protests usually included demands to reduce political repression, promote political reform, and reduce the influence of international firms." In short, the authors believe that we often give short shrift to popular unrest in Africa because we think of these uprisings as emotional reactions to temporary economic hardships rather than demands for systemic change.

Speaking of systemic change, the authors also give voice to those Africans who decry the failures of multiparty democracy, complaining that the increase in political parties does not come with any increase in real choices. When the loyal opposition becomes a little too loyal, and essentially functions as just another part of the ruling establishment, then democracy fails. During the 1990s donor countries, international institutions, and a host of NGOs pressured single party African states to transition into multiparty democracies, but this transition has not necessarily produced real choice for the people. At the same time, the authors point out that institutions like the IMF were pushing austerity on governments in Africa, resulting in reduced government

services and subsidies. A decade of such policies helped drive the uprisings we have seen in recent years.

Branch and Mampilly spend perhaps a fourth of their book discussing why African protest movements exist, what their common demands tend to be, and their general structure. They also delve into the history of popular protest in Africa, providing an analysis of the protest movements that helped end colonialism. However, it is in their case studies where the authors probably do their best work. They dedicate a chapter each to protest movements in various countries, including Occupy Nigeria, Walk to Work in Uganda, and various political uprisings in Sudan and Ethiopia. The chapters, especially the ones about Nigeria and Uganda, provide a unique insight into political movements that are rarely mentioned in the international press.

But, ultimately, the reader is left to wonder about the effectiveness of these popular uprisings. None of the movements described by the authors can be described as political successes, and at the same time an argument could be made that uprisings frighten away potential investors. Conservatives could certainly point to Egypt and Libya as an example of the frightening results of “successful” uprisings. Unsuccessful movements like Walk to Work in Uganda and Occupy

Nigeria are in some ways even more discouraging. They begin with such hope, but fizzle out largely in disappointment.

Street protests may spring from systemic economic problems or lack of real political choice, but they can be twisted into populist movements that can demand nationalization of hydrocarbon assets or tougher terms in exploration and production agreements.

Moreover, the potential for popular uprisings has to frighten oil companies working in Africa. While oil infrastructure is usually unscathed by such movements (with the post uprising fallout in Libya being the notable exception) when Branch and Mampilly write about the oversize influence of foreign firms, they might as well be addressing the international oil industry. Street protests may spring from systemic economic problems or lack of real political choice, but they can be twisted into populist movements that can demand nationalization of hydrocarbon assets or tougher terms in exploration and production agreements.

All of this means that when Branch and Mampilly end with a direct comparison between African protest movements and similar movements in the developed world, it can be downright depressing both for those who support the status quo and for those who are activists themselves. “Activists in the West who today rise up against austerity measures in their own countries are, in many ways, following paths that were first walked by African activists who have faced choiceless democracies and austerity for decades.” It’s good to see the developed world following Africa for a change, but that might not necessarily be a good thing. 

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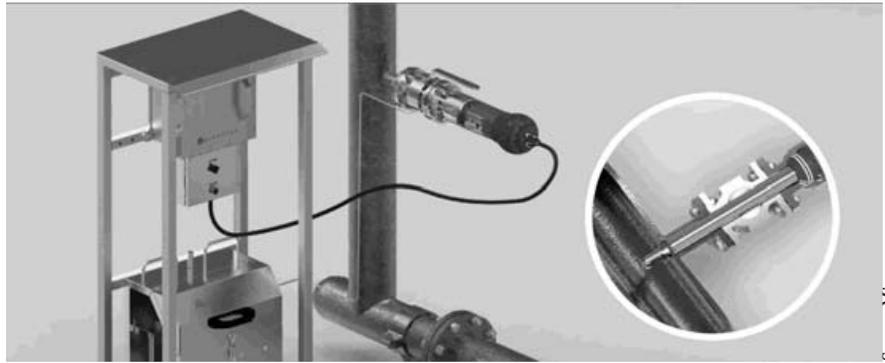
### Mirmorax Launches Desktop Oil-in-Water Analyzer

Mirmorax AS, an oil in water analyzer solutions provider, announced the launch of its Desktop Oil-in-Water Analyzer – the DT250. The portable instrument, based on Mirmorax’s third generation ultrasonic technology, provides efficient, flexible and highly accurate sample analysis as well as live measurements of oil and solids in produced water.

For operators, this will lead to improved monitoring capabilities and the flexibility to debottleneck various parts of the processing system. This will bring new value and optimization possibilities to existing separators and filters, enable targeted use of chemicals, and ensure the meeting of all environmental requirements. The Desktop Oil-in-Water Analyzer will also be particularly suited to challenging fields that host separation from different tie-backs with various oil types in the same produced water.

“With the current low oil & gas prices, the flexible, cost-effective and accurate monitoring of oil in water to ensure optimal operations, effective separation and environmental compliance has never been more important,” said Mirmorax CEO, May Britt Lillevedt. “That’s why the Desktop Oil-in-Water Analyzer is truly a solution for our times – delivering both highly accurate and crucial production information but also in a flexible, portable and highly effective manner.”

Key benefits to operators of the Desktop Oil-in-Water Analyzer’s features include: accurate and robust oil-in-water analysis with the ability



to handle chemicals and various oil types. The new instrument simultaneously detects oil and solid particles; calculates the mean size of oil particles and solids; and provides other crucial input information, such as the temperature and salinity of process water.

A low maintenance, robust and easy-to-use system that can be set up in minutes and either be used as a sample analyzer or as a by-pass analyzer providing continuous measurements. The instrument can analyze fresh produced water samples or samples that have been stored for a longer time. The instrument is lightweight, is ideal as a portable test instrument that can be mobilized quickly (fulfilling the weight and size requirements for offshore helicopter transportation) and comes in a robust, weatherproof case.

The Mirmorax Oil-in-Water Analyzer is based on ultrasonic measurements in which individual acoustic echoes are characterized using advanced

signal processing. A highly focused acoustic signal is transmitted directly into the produced water and the reflection and absorption of the signal provides a wide range of accurate measurements. The analyzer is designed to manage the lower range (0-250 ppm) of oil and particles and delivers accurate classifications of particles and size distributions.

The integrated design also includes a separate chamber where the sample is analyzed with a stirrer keeping the sample homogeneous at all times. Analysis time for a sample is less than five minutes under normal conditions with the model also including an outlet interface that allows for by-pass flow of produced water to flow continuously through the measurement chamber. This is particularly useful when finding the optimal location for in-line probes. The instrument also comes with a produced water-sampling bottle that enables closed circuit sampling for optimal HSE and the conditioning of old samples for later analysis.

### New Air Driven Liquid Pump Released

Parker Autoclave Engineers, part of Parker Hannifin – a global provider of motion and control technologies, has released an innovative new air driven liquid pump, the AHL118. A high volume, double-ended, double acting high pressure pump, the AHL118 is designed for use in oil and gas, chemical, industrial and research applications.

The pump operates to a pressure range of 23,000 psi and at 5.6 gallons per minute (25.5 liters). The AHL118 is designed to be extremely robust, featuring a carbon-based prioritized coating to the plunger, which is three times harder than Stellite. This makes the plunger unscratchable, extending the lifespan of the seals and reducing

downtime, repairs and servicing, delivering major savings to the customer.

All AHL118’s hydraulic parts are manufactured from stainless steel, making them very durable with extended Mean Time Between Maintenance (MTBM) and increasing safety. AHL118’s pump hardware is also manufactured from stainless steel, which is anodized to the bottom and top caps for superior corrosion resistance.

Shawn P. Landry, IPD Product Manager – Pumps/Systems for Parker Autoclave Engineers, said: “This air driven liquid pump offers unrivalled performance and reliability, bringing huge benefits to customers. When developing



the product, we analyzed what the issues were in the market and so designed a pump that would last significantly longer, lowering downtime and maximizing efficiency.”

## Lucrative Waste Heat Recovery

Industrial operations require significant energy, with large amounts of this energy disappearing as waste heat after use. Energy Nest's thermal energy storage now ensures that this widely untapped energy reserve can be converted effectively. Once stored, the time-shifted waste heat can be used in a variety of ways – e.g. to provide process steam, to generate own power or to stabilize entire power grids. It comes with many advantages, but the main one being a significant increase in resource efficiency. Consequently, industrial operations become environmentally friendlier. Industrial retrofits not only lead to a better energy balance, moreover

such projects have short project paybacks making it economically very attractive.

One element of this new technical solution is the HEATCRETE® – a high performance concrete, which is composed of 75% quartz aggregates and 25% additives. A steel carrier structure encloses HEATCRETE®-embedded carbon steel pipes, through which a heat transfer fluid is charging and discharging the storage system at a pressure of up to 160 bar. A single module, fitting into a standard 40-foot container, provides an energy capacity of up to two megawatt hours thermal. Due to its modular

structure, this system can be scaled up into the gigawatt hour range.

It is by far cheaper compared to other energy storage technologies – at around \$20-\$25 per kilowatt hour: a fraction of battery costs. Due to its rigid structure and no moving parts, the storage system works virtually maintenance-free, so that operating costs are a fifth of what other storage systems require. The potential for own power generation via time shifted waste heat is tremendous. Companies can, for example, avoid peak price tariffs with their own waste-heat-to-power installation.

## Largest Hole-Size LWD Density Service Debuts

Sperry Drilling, a Halliburton business, announced the release of the 9-1/2-inch Azimuthal Lithodensity (ALD™) service, providing real-time density measurements and images in boreholes up to 17-1/2 inches. With this addition, Halliburton offers the greatest range of hole-size capability and is the only service company to provide this larger wellbore measurement.

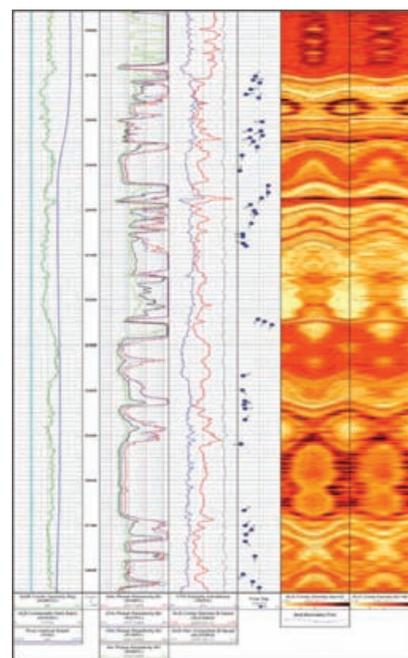
ALD provides downhole density measurements, including high-quality borehole image logs, to help optimize wellbore placement through geosteering and to reduce geological uncertainties. The measurements, delivered via LWD, also eliminate costly wireline conveyance runs and capture data immediately after drilling when the borehole is in the best condition.

The 9-1/2-inch ALD provides the same functionality as its smaller counterparts, including azimuthal density, and photoelectric and acoustic stand-off measurements. This information has a wide range of applications that can help determine a formation's porosity,

rock strength, pore pressure and borehole geometry.

"ALD addresses an important market need and is currently the only commercially available LWD density service designed for large-diameter boreholes," said Corey Walker, vice president of Sperry Drilling. "In areas like the Gulf of Mexico and other regions where large boreholes are common, we are well positioned to meet increasing demand."

In the Gulf of Mexico, ALD has demonstrated value to operators. In one case, an operator used the density measurement to identify shallow hydrocarbon deposits in a 17-1/2-inch borehole. In another case, an operator used borehole density images in real-time to determine the formation dip and reservoir structure immediately below a massive salt interval in a 16-1/2-inch borehole, where surface seismic data was poor. Previously, operators had to perform wireline runs to retrieve these results, but ALD provided this information without adding expensive deepwater rig time, operation costs, or risks associated with wireline conveyance.



6-3/4-in. ALD™ sensor data from the North Sea. A 16-bin real-time image is shown to the right of the 16-bin recorded image.

## New Epoxy Linings for Assets in Challenging Environments

With the launch of its new Hempaline Defend epoxy linings, global coatings company Hempel now offers a complete range of linings for challenging applications, where heavy-duty performance and a fast return to service are essential for continued production uptime.

Designed specifically for the power and oil & gas industries, Hempel's new Hempaline Defend epoxy linings provide long-term protection for assets in challenging environments, such as bulk storage tanks, process vessels, frac tanks and secondary containment areas. The internal linings

protect both steel and concrete from aggressive chemicals, elevated temperatures and abrasive service conditions.

Hempel's newly launched Hempaline Defend epoxy linings come with a choice of hardeners, enabling customers to select a single-coat system that allows a vessel to be returned to service in as little as 24 hours without any drop in performance.

Pernille Lind Olsen, Hempel Group Product & Portfolio Director, comments: "In the power and oil & gas industries, equipment downtime can

often mean a loss of revenue. Our Hempaline Defend epoxy linings make it simple for customers to select a fast-cure system when shortened downtime is essential."

Hempaline Defend epoxy coatings complement Hempel's recently launched Hempaline Defend vinyl ester range, and mean that Hempel can now offer customers a full range of products for internal and external protection in aggressive environments. The Hempaline Defend range is currently available in southeast Asia and the Middle East, where they are locally produced for shorter delivery times.

# SEISMIC

## Defining Potential

*Seismic advances continue to assist operators in obtaining a clearer picture in defining their exploration prospects.*

Offshore and onshore, advancements in seismic technology continue to be a game changer to the global oil & gas exploration industry, allowing a clearer, sub-surface picture of a basin and narrowing down the most prospective of prospects. Over the past year or so, service providers have released a number of new and/or improved technologies to narrow those prospects down even further. Here we look at just a few of the most recent.

### Vessels

Improvements to seismic acquisition vessels has been impressive, and this past March PGS announced its most recent fleet upgrade. The latest Ramform Titan-class vessel, the *Ramform Tethys*, was celebrated at a ceremony in Nagasaki, Japan in March. This newbuild enhances the Ramform Titan-class acquisition platform and sets the standard for seismic operations for the next 25 years, according to company reports.

PGS' first Ramform Titan-class vessels, the *Ramform Titan* and the *Ramform Atlas* were delivered in 2013 and 2014. The *Ramform Tethys*, and the *Ramform Hyperion*, will be even better due to small modifications of equipment handling on the back deck and an increase in engine power to 26,400 kW from 23,040 kW on the first two Ramform Titan-class vessels.

"With the increased power output and the back deck modifications we are enhancing the Ramform Titan-class acquisition platform further.

Productivity, safety, stability and redundancy are the key benefits of these vessels. Their ability to tow many streamers gives high data quality with dense cross-line sampling and cost efficient acquisition with wide tows," said Per Arild Reksnes, EVP Operations.

The design dovetails advanced maritime technology to the imaging capabilities of the GeoStreamer® seismic acquisition technology. The 70-meter broad stern is fully exploited with 24 streamer reels: 16 reels aligned abreast and 8 reels further forward, with capacity for 12 kilometer streamers on each reel. With such capabilities the *Ramform Tethys* has tremendous flexibility and redundancy for high capacity configurations. Increased work space and advanced equipment handling mean safer and even more robust operations. The Ramform concept design is made by Roar Ramde.

The vessel carries over 6,000 tons of fuel and equipment. She will typically tow a network of several hundred thousand recording sensors over an area greater than 12 sq km, equivalent to nearly 1,200 soccer pitches, or 3.5 times the size of Central Park.

For PGS and its clients, more rapid deployment and retrieval of equipment, as well as greater operational capacity will translate into faster completion of surveys and increased uptime in marginal weather. The period between major yard stays is also extended by approximately 50%.



Source: PGS



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Jon Erik Reinhardsen, President and CEO of PGS stated in a comment: “The *Ramform Tethys* further strengthens our fleet productivity and together with the other Ramform Titan-class vessels will enhance our competitive edge. In the current challenging market environment we also experience more demand for our best capacity and *Ramform Tethys* will add to PGS ultra-high-end value proposition.”

## Data Integration

PGS, also announced this past June that it had entered into an agreement with Rock Solid Images (RSI) related to the integration of seismic, EM, well log and rock physics data. This agreement will allow PGS to offer a range of new products and services based on RSI's patented workflows, building on PGS' GeoStreamer® expertise and detailed reservoir understanding.

The company says that its innovative Towed Streamer EM system not only revolutionizes acquisition efficiency but also generates richer datasets which are significantly higher density than those generated by traditional node-based methods. It is this high data density and richness in both offsets and frequencies that make PGS EM data easier to integrate with seismic, and ideal for reservoir characterization. PGS is now able to use results from EM inversion, together with the well log, rock physics, and pre-stack broadband seismic data to produce superior interpretation results.

“The real value of CSEM data is extracted once it is fully integrated with seismic. This agreement allows us to develop more quantitative workflows so that Towed Streamer EM data can be used beyond exploration and into reservoir characterization,” said Jonathan Midgley, Vice President PGS EM.

“Our fantastic GeoStreamer technology is ideal for quantitative interpretation but the value is further improved when collocated with high-density EM data. Now we can integrate both these datasets in our workflows. Prestack AVO compliant GeoStreamer seismic combined with Towed Streamer EM, is a tremendous tool for prospect de-risking,” commented Cyrille Reiser, PGS Reservoir Characterization Director.

## Shallow Reservoir Imaging

Just recently, CGG launched its TopSeis™, the latest evolution in offshore broadband seismic, specifically designed to overcome the intrinsic lack of near offsets inherent in 3D towed-streamer seismic.

Exacerbated by the use of progressively wider spreads to meet the industry's quest for greater efficiency, the lack of near offsets leads to an inability to image shallow geological features, such as faults, gas pockets, channels and stratigraphic pinch-outs, effectively. By overcoming this shortcoming, TopSeis enables exploration and development teams to make critical investment decisions on the basis of superior high-density broadband data delivered at a lower cost compared to other techniques, notably ocean bottom seismic.

TopSeis is the latest outcome of eight years of collaboration between Lundin Norway AS and CGG to develop innovative broadband solutions, including early benchmarking of CGG's BroadSeis™ solution, to improve subsurface understanding and increase exploration success. Its dual-vessel acquisition design, which places CGG's broadband source over a customized receiver spread, combined with proprietary

imaging, is an industry first. Extensive field trials have shown TopSeis to be a highly-effective solution which delivers unsurpassed broadband imaging of shallow targets.

TopSeis will play a key part in a forthcoming integrated geoscience study, including an extensive commercial survey CGG plans to acquire in the Barents Sea in 2017. This will offer other early adopters of this new technology the opportunity to benefit from the anticipated step-change in image quality for exploration and development in this region. TopSeis is also expected to have significant potential for applications in other areas offshore Norway as well as other parts of the world.

Halvor Jahre, Exploration Manager, Lundin Norway AS, said: “After successful close cooperation with CGG to develop, design and test the TopSeis acquisition concept, we view TopSeis as the next generation of broadband seismic acquisition. Results from a test offshore Gabon appear to confirm the data uplift indicated by modeling studies and we plan to move forward with full-scale TopSeis surveys on the Loppa High in the Barents Sea during 2017.”

Jean-Georges Malcor, CEO of CGG, said: “CGG has once again drawn on the multi-disciplinary expertise within its integrated geoscience offering to spearhead another step-change in seismic imaging to enhance subsurface knowledge. We are delighted to have had the opportunity to work so closely with Lundin on the development of TopSeis and look forward to seeing how this solution will open the door to a better understanding of shallow reservoirs to help oil and gas companies extract the full potential of these highly prospective fields in the Barents Sea and beyond. As we have seen with StagSeis™, the full-azimuth solution that we purpose-designed for subsalt imaging in the Gulf of Mexico, these made-to-measure approaches can prove very successful and reap dividends for the industry as a whole.”

## Unique Acquisition Programs

Polarcus undertook an ultra-wide 3D marine seismic project offshore Myanmar. *Polarcus Amani* towed an in-sea configuration that measured 1.8 km wide across the front ends. With each of the 10 streamers separated by 200 meters, the total area covered by the spread is 17.6 sq.km. This is the largest in-sea configuration ever towed by



Source: Polarcus

*Polarculus Amani sets acquisition records*

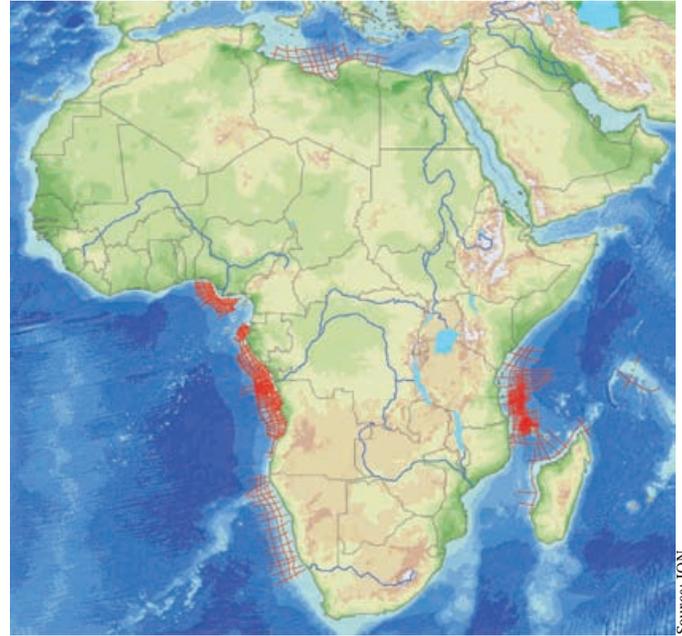
a single seismic vessel as well as the largest man-made moving object on earth.

With such an achievement, Polarcus is setting new acquisition performance records. The acquisition plan in Myanmar had the program delivering up to 190 sq km per day, a production rate that is currently unrivalled in the seismic industry.

Around a decade ago, ION Geophysical introduced its BasinSPANs, or basin-wide seismic data programs to address the challenge of evaluating both conventional and unconventional plays. BasinSPAN (SPAN) programs are basin-wide deep, geologically driven regional multi-client programs designed to evaluate prospectivity in new frontiers or identify new play concepts. BasinSPAN programs are custom designed with local experts to provide critical insights into the geologic evolution, deep basin architecture, and depositional and structural history of a petroleum system.

BasinSPANs are depth imaged by ION using the most advanced processing tools available. Particular attention is paid to ensure the data ties available well information and provides a consistent framework to integrate 2D and 3D datasets and evaluate prospects.

The company has conducted numerous BasinSPANs globally, including many in Africa such as the CongoSPAN, East AfricaSPAN,



Source: ION

*Africa BasinSPAN Surveys*

EquatorSPAN, LibyaSPAN, NamibiaSPAN, and NigeriaSPAN, collectively known as AfricaSPAN. The surveys collectively encompass over 95,500 km of data. 

MEGA Endüstri Kontrol Sistemleri has designed and developed a proprietary and state of the art Terminal Automation System, Flashtech®. With this in-house developed software package, Mega has been able to present a whole turnkey, flexible and multi-layer loading terminal automation solutions linking the field equipment and instrumentation to the high level supervisory system and interface to customer's operational and business systems.

MEGA has developed a new project for nineteen Terminals in Turkey for Jetty Loading&Unloading Metering Systems, as it has become a legal obligation to install custody transfer metering systems on the product transfer pipe lines for the petroleum products which are subject to customs duty.

MEGA has successfully installed and put into service most of these custody metering skids at terminals with Flashtech® Automation.





**T**he petroleum industry has not seen much, if any, improvement over the past year. If anything, in some instances the challenges that have plagued the industry over the last couple of years have deepened. The drop in oil prices and insecurity in many a producing region on the African continent have all taken their toll. It is not only international oil companies (IOCs) that have suffered obviously, national oil companies (NOCs) have taken a hard hit and unlike some IOCs many do not have the cushion or deep financial pockets to keep them going as their efforts are geared toward filling national coffers.

The continent's NOCs come in every shape, size and prowess; no two are the same so the criteria for judging their activities is less regimented than that of *Petroleum Africa's* Annual Independent contenders. The Big 5 NOCs—EGPC, NNPC, NOC, Sonangol, and Sonatrach have been hit hard as they, and the countries they represent, depend heavily on crude revenues. The continent has a host of small, medium, and even a couple larger NOCs trying to make their mark on the industry for their respective countries during trying times for the petroleum sector. Whether a Big 5 NOC or one of the smaller At Large NOCs, all the African NOCs under consideration for this year's title have worked hard to continue to progress their respective countries' agendas.

### The Big 5

As stated previously Big 5 NOCs have been hit hard by the challenges the industry is experiencing, some have handled it better than others. One firm that has continued to push through over the year, knowing that its country depends on the funds generated by its efforts in the petroleum sector. This year's winner of the Big 5 NOC of the Year is Algeria's Sonatrach. The past decade has not been kind to Sonatrach. The company has seen less and less foreign investment over the years, has been embroiled in corruption scandals, and the security of some of its facilities has been called in to question time and again, yet despite this the company has continued to persevere, and for the most part prosper.

The NOC has 154 subsidiaries both nationally and internationally, with 105 of those subsidiaries operating in Algeria and 49 others around the world in countries such as Peru, England, Spain, Mali, Niger, and Libya. Sonatrach's subsidiaries cover a wide range of disciplines inside the industry and peripherally including drilling operations, engineering, well services, shipping, and marketing.

Over the past year Sonatrach has done its utmost to stay near the top of the production charts on the continent and initiated plans at the outset of the year to aid in that. The company planned to raise production by 5% in 2016 over 2015 numbers and is targeting a 30% increase by 2020. By mid-2016 the company had already seen two of its major oil fields experience an uptick in production, the Hassi Messaoud and the Ourhoud. The Hassi Messaoud's production is up by 50,000 bpd and the Ourhoud is up 25,000 bpd as part of Sonatrach's goal to maximize output on mature fields. In this effort, it has not been afraid to spend its dwindling cash to get the job done.



Source: Cepisa

*Upstream activities on the Ourhoud*

The company initiated its plans to maximize production on the Hassi Messaoud, Algeria's oldest and largest oil field. Sonatrach's plans called for the drilling of 32 to 50 wells. Under this scheme it awarded a contract for the revamp and installation of a new production system, and undertook the updating of a well on the field itself at the cost of \$14 million.

Over 2016 Algeria's NOC saw the start up of the Southern Fields project on the In Salah. Phase 2 of the In Salah Gas Project involved the development of the four gas fields in the south of the area – the Gour Mahmoud, the In Salah, the Garet el Befinat, and the Hassi Moumene. Developing these Southern Fields allow for production to maintain a level of 9 Bcm/y. The development included the construction of a new processing facility, more than 300 km of pipelines, and the drilling and tie-in of 26 wells. Besides the start-up of the Southern Fields, the In Salah saw its gas plant resume full production for the first time since a militant attack in 2013 when its third train came back online.

While security concerns have been an issue with foreign firms operating in the country, leading to two firms pulling their employees from the Khrechba gas field in April following an attack, Sonatrach turned around and had its own employees operate the field in the absence of the foreigners. The incident highlighted that the NOC was more than capable to carry on in whatever capacity necessary without the aid of foreign workers.

On the drilling end, the state-run firm participated in a number programs with partners including the successful third exploration phase of the Hassi Bir Rakaiz project and in August reported a new oil and gas discovery was made on the concession. The discovery had flow rates of around 2,406 bpd of crude and associated gas flow was 2.9 Mmcfd. It also participated in the launch of development drilling at Ain Tsila. To date the Groupement Isarene partners have drilled two wells and spud a third. The first well, the AT-10 development well, reached a total depth of 2,005 meters MD, with a planned 61-meter penetration of a fully gas and condensate bearing Ordovician formation. Next was the AT-13 development well which, like the AT-10, penetrated gas and condensate in the Ordovician formation.

Besides the activity discussed, the NOC has taken the 'you have to spend money to make money' approach, issuing a number of contracts and tenders on both the upstream and downstream side. Earlier this year the company awarded a FEED contract for three new refineries, there was a package of contracts totaling \$880 million for oil and gas drilling tubes, and a tender for the purchase of gasoil and gasoline. It also handed out a number of contracts to oil service firms; US oil service firms Schlumberger, Weatherford, and Baker Hughes were all awarded contracts for work in the North African country. Schlumberger and Weatherford secured contracts for cementing and pumping services. The Schlumberger contract award is worth \$75 million and the Weatherford contract is worth \$11 million. Baker Hughes secured a contract for \$50 million through its Algerian unit, BJSP, in which



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Sonatrach holds a 51% stake. A fourth contract worth \$44 million was awarded to the Emirati firm NPS.

The effort Sonatrach has shown throughout the year under challenging conditions was met with considerable success. While keeping the minimum *status quo* is a feat in itself, Sonatrach went beyond the call and organized a hefty work program and kept the pace on meeting its goals, including upping its production. For this effort and a number of others, Sonatrach is deserving to return to the *Petroleum Africa* podium after a brief absence as its annual National Oil Company of the Year once again. Congratulations to the Sonatrach team!

## NOC At Large

With 53 countries on the continent, Africa plays host to a number of NOCs outside the Big 5 realm and while new NOCs are not formed on a regular basis, the continent does have a few newbies who have yet to cut their teeth in the industry. These non-Big 5 NOCs also come in all shapes and sizes as do their levels of industry prowess. In addition, they also differ in how they participate in their petroleum sector, some are fully vested, integrated firms while others just oversee the industry.

This year's winner of the NOC At Large award is one of those firms that is fully vested in its country's industry and has worked hard to ensure that whatever activity takes place in the country, it will provide the most benefit to a wide range of its citizenry. The firm is not the largest of At Large NOCs or the most technically advanced, but it has upped its game over the past several years establishing itself as a force to be reckoned with.

Making a back-to-back appearance as the winner of NOC At Large is Ghana National Petroleum Corp., or GNPC. The state-run firm now has a host of subsidiaries aiding it in its endeavors. GNPC Exploration and Production Company (Explorco), GNPC's 100%-owned exploration and production subsidiary serves as the company's operating arm on selected projects. Explorco is currently partnering with international firms on the South Deepwater Tano Block and the Expanded Shallow Water Tano Block. There is also the Saltpond Offshore Producing Co. Ltd., an operating and production company for the Saltpond Field; GNPC owns 45% with the remainder held by Lushann Eternit Energy Ltd. GNPC also has the AGM Operating Company (OPCO) which uses the joint operating company concept in which GNPC-Explorco and AGM Ghana will jointly operate selected blocks.

This past year GNPC has added to the production totals it oversees with the addition of flows from the TEN development. The firm played a vital role in the identification, mapping of the leads and prospects even before the first discovery of the three fields was made through data it acquired prior to the block being awarded. Actions taken by the company in the past paved the way for its participation in the success of the TEN development. The underlying principle of GNPC as an NOC was to protect national interest, while at the same time, creating



Source: Tullow Oil

*Subsea installation begins on the TEN development*

the right environment for a fair return for investors. This GNPC pursued by ensuring that the TEN Plan of Development had national interest at the fore and also had enough offerings for the partners to develop the field. GNPC also ensured that the operator and partners committed to creating opportunities for Ghanaians to gain experience and develop skills. These actions all combined for a successful development path for the project.

GNPC is also involved in aiding Ghana keep up with the country's power generation needs. In early 2016 the company signed a Heads of Terms for the construction and operation of the liquefied natural gas (LNG) storage, regasification and delivery facilities at Tema. The Tema LNG Project, comprising a capital outlay of over \$550 million, will be implemented on a build-own-operate-transfer (BOOT) basis and GNPC will take over the assets after the project's 20-year term is completed (*see Downstream Focus, page 14-15, for more details*).

The company also launched a call for expression of interests and a tender over the period to facilitate its exploration plans onshore Ghana in the Voltaian Basin. The expression of interest was issued internationally, while the tender was issued inside the country. Ghana called for an expression of Interest from reputable international service companies to be shortlisted to receive an Invitation to Tender (ITT) for the processing of 2D seismic data before Q3 2017. The tender was for the supply and provision of VHF radios and satellite phones and related services for use in its upcoming survey.

Given the state of the industry worldwide it has been difficult enough for an IOC to survive and prosper, let alone a relatively small NOC. GNPC has not only been able to survive but has flourished in its own growth path – upgrading the skills of its in-house teams and broadening its technical capabilities – all the while looking out for the nation's best interests and overseeing the TEN development come online. It is for these reasons, among others, that GNPC remains *Petroleum Africa's* NOC At Large for the second year running. Congratulations to the entire GNPC team for a successful year, well done! 

By Jennifer Nickle, Deputy Editor



Fayeze Seraj

# LIBYA



## Prime Minister (Presidency Council):

Fayeze Seraj

**Independence:** December 24, 1951  
(from UN trusteeship)

**Population:** 6,411,776 (July 2015 est.)

**GDP (purchasing power parity):**  
\$92.61 billion (2015 est.)

**GDP - real growth rate:** -6.4% (2015 est.)

**GDP - per capita (PPP):** \$14,600 (2015 est.)

**Oil - production:** 332,000 bpd (June 2016)

**Oil - consumption:** 248,000 bpd (2013 est.)

**Oil - proved reserves:**

48 billion barrels (2014 est.)

**Natural gas - production:**

430 Bcf (2012 est.)

**Natural gas - consumption:**

202 Bcf (2012 est.)

**Natural gas - proved reserves:**

54.7 Tcf (2015 est.)

*Source: Various, including CIA World Factbook and EIA*

## Political and Economic Snapshot

The past has not brought a whole lot of peace to the political landscape in Libya, although the future of the country is slightly less bleak than when covered last year by *Petroleum Africa*. Over the past year a UN-backed Government of National Accord (GNA) was established. In December representatives from a broad range of Libyan society signed a UN-brokered agreement on forming a national unity government. The signing of the agreement was hailed by a number of dignitaries around the world as “historic” and “essential building blocks towards a peaceful, secure and prosperous Libya.”

While the signing was welcomed worldwide it should be noted that automatic peace and security was not the result. According to UN Secretary General Ban Ki-moon the signing was just the “beginning of a difficult journey.” One of those difficulties is that the government that was established in the east of the country has failed to endorse the GNA from the beginning. A presidential council was appointed to form the unity government in January and in February the council named its ministers for parliament to vote on. The list was sent to Libya’s Eastern parliament for approval of the 13 ministers and five ministers of state the council had named. The government in the East rejected the list of ministers. Just recently parliament based in Eastern Libya voted against a motion of confidence in the GNA. This was the first

time since January that the parliament has gotten together to vote. The GNA had been trying to receive an endorsement from the East’s parliament for a number of months and the vote of no confidence is seen as a blow to the GNA’s ability to bring about unity to the country.

Another difficulty for the GNA is the insurgency of Daesh (ISIL/ISIS) fighters in the country. The UN plan under which the unity government was named was designed to help Libya stabilize and tackle a growing threat from Daesh or the Islamic State of Iraq and the Levant. The CIA estimates that the number of Daesh fighters in Libya is increasing. In June CIA Director William Brennan said there were an estimated 5,000-8,000 fighters on the ground, up from an estimated 2,000-5,000 in February. Libyan troops, those aligned with the GNA and those loyal to the government in the East, have been battling Daesh militants across the country with some success. Over the past several months a push to oust the militants from the coastal city has been conducted with some positive results. The US has also contributed to efforts to oust Daesh, conducting airstrikes on the militants’ positions in February and early August.

While Libya has taken some steps forward in its political situation, albeit small steps, the economic situation continues to grow more dire. The instability and fighting has cut off the majority of its main revenue

generator, oil and gas exports, due to fighting and protests around oil and gas fields and export terminals. According to multiple sources the country's GDP was -6.4% in 2015 and is expected to come in at a negative once again in 2016, with estimates putting it at -0.6% for the year. On a positive note, in the event of a resolution to conflict and a rapid resumption of oil production, economic growth could recover quickly and economists say it could hit 3.9% for 2017 if this happens. According to a report on the Libyan economy by African Economic

Outlook, Libya's economic situation over 2016 will largely depend on the implementation of the GNA and the extent of security stabilization. In this context, the economic recovery will proceed slowly, especially in the oil sector. In 2017, the implementation of an important reforms program could release substantial growth potential and significant improvements in both the budget and current balances. This would stabilize Libya's official reserves and help create a climate of trust and confidence for potential investors.

## Petroleum Sector

With all the issues Libya is embroiled in, it should not come as a surprise that the country's oil and natural gas reserves totals have not changed over the past year. As reported in the 2015 coverage in *Petroleum Africa*, the country has booked reserves totaling 46.42 billion barrels of crude and an estimated 52 trillion cubic feet (Tcf) of natural gas. Libya still remains near the top of the African chart when it comes to reserves.

The country used to sit near the top of the African producers chart but it is now closer to the bottom. The poor political and security situation has had serious consequences for the economy, public finance and official reserves. An average of 400,000 barrels per day (bpd) were produced in 2015, quite a drop from the 1.8 million bpd it was producing prior to the Arab Spring.

As the industry continues to stagnate due to the security situation, there is little to report on either the upstream or downstream side of the equation. Most international firms with holdings in the country have their operations on hold or are producing at a fraction of their pre-civil war levels.

Companies who hold stakes in Libya have not been flooding the industry with news on their operations; although there are one of two who have had something to report, Italy's ENI is one of them. The firm has continued to produce throughout each crisis the country has faced over the past half-a-decade, mostly from its offshore fields. At the end of 2015 the company was producing at a rate of 300,000 boepd. ENI pushed forward with its exploration activities offshore, which over 2015 and 2016 resulted in discoveries. On ENI's contract Area D it made gas and condensate discoveries in the offshore Bahar Essalam South exploration prospect and the Bouri North exploration prospect. Contract Area D was awarded to ENI in 2008 under the EPSA IV contract model. The latest exploration activity conducted by the company on Area D was the spudding of the C1-16/3 in late July. The well is being drilled in a water depth of 515 ft, south of the Bahr-Essalam gas field. The well is expected to be drilled to a total depth of 10,845 ft and should be complete within 77 days.

On the development end ENI's JV company with NOC, Mellitah Oil Co., recently awarded Technip a major contract for a job for its Bahr Essalam Phase II development. The contract has Technip performing overall design, detailed engineering, and delivering the project management, as well as procurement, installation, tie-ins, pre-commissioning and commissioning of the development in the Mediterranean. This natural gas field development will be tied back to the Sabratha platform. This will be associated with the provision of a gas gathering system, comprised of production pipelines, subsea



*Statoil in the Murzuq Basin*

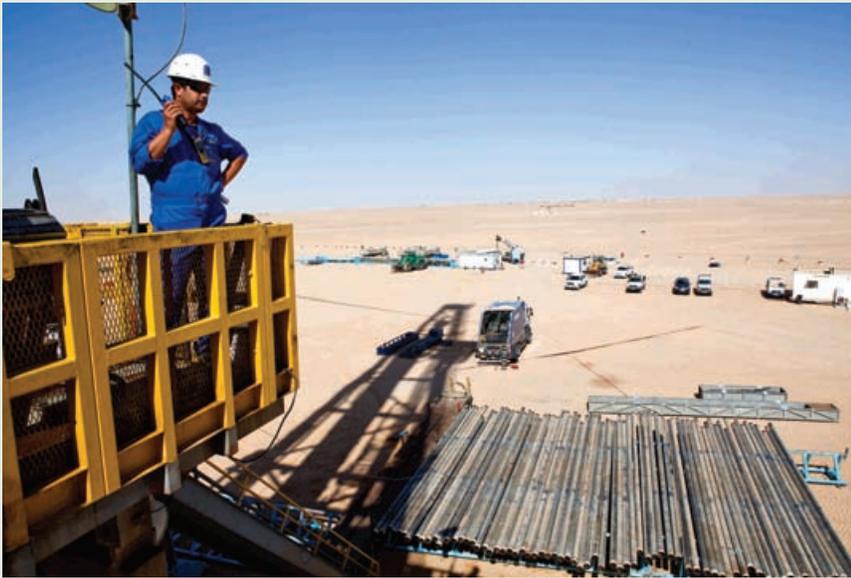
isolation valve (SSIV), umbilicals, as well as extensive diving and installation campaigns. It will also include modifications to the Sabratha platform regarding the topsides. Offshore installation is scheduled for H2 2017 through to H2 2018.

Unfortunately, oil and gas activity does not run so smoothly onshore. In April of this year the company had to evacuate its staff from the Wafa, Tibesti, and Bayda fields on fears of attacks by Daesh militants. All of the staff was evacuated from the Wafa, while a partial evacuation took place at the Tibesti and Bayda fields; production however was not affected by the shut ins.

Wintershall operates in eight onshore oil fields in the eastern Sirte Basin; these fields are spread over concessions C96 and C97. The company is partnered with Gazprom on the concessions. Because of operational challenges such as strikes and blockades at export terminals, Wintershall has had to repeatedly suspend its operations on both concessions. In April of this year the company said that over 2015 it only saw 125 producing days. Over the 2015 period not only did the company produce for roughly only one-third of the year, but its production rate was down almost two-thirds. The German firm saw average flows of only 35,000 bpd for the year, a big drop from its previous average of up to 100,000 bpd during peaceful times.

France's Total has two fields in Libya, the Mabruk with Statoil in the Sirte Basin and El Sharara in the Murzuq Basin. Unfortunately, due to the insecurity the company's production has been suspended since late-2014. Total also held an interest in the offshore Al Jurf field on the C137 block, partnered with Wintershall and NOC. In H2 2015 it was reported that Total sold its 51% stake in Mabruk Oil Company, the JV between Total and NOC which operates the Al Jurf, to Libya's NOC

Source: Wintershall



*Wintershall operations in Libya during peaceful times*

based in Tripoli. Statoil, mentioned previously, also holds stakes in Area 147 in the Murzuq Basin. Operations on this block have been on hold since 2015 due to the security situation.

Occidental Petroleum, or Oxy, is looking to make a strategic exit from the country. The company's CEO Vicki Hollub said at the outset of 2016 that there were a few assets that needed to be disposed of and the company's holdings in Libya were included. While the company envisaged an exit from a number of its assets by the end of 2016, the disposal of the Libyan assets will require more time. Exiting various fields in Libya's Sirte Basin and other onshore exploration blocks holds more challenges than its other assets. "We haven't really defined or disclosed what our exit strategy is right now, so that's one of the options that will probably take longer," Hollub said.

The country has two National Oil Corps., one based in Tripoli and another operated out of the East by the government in Tobruk. The two NOCs caused much confusion as industry players were not confident as to which firm they should be dealing with. Recently there has been movement on the NOC front with the two agreeing in principle to unify the oil sector. Following this agreement, the two firms indicated that they had agreed on a structure for the group that could end the battle over who has the right to export Libyan crude. Under the agreement Mustafa Sanalla, from the Tripoli-based NOC, will remain chairman of the group, while the head of the eastern-backed NOC, Naji al-Maghrabi, will serve as a board member. It is hoped that a unified oil sector will be key in supporting the unity government. Over the past several months NOC has been busy meeting with various JV companies, local officials, foreign dignitaries, and visiting petroleum facilities across the country.

While the two NOCs confused the industry, one of the subsidiaries of NOC continued to trudge along getting the job done despite all the turmoil and violence surrounding oil operations, that subsidiary is the Arabian Gulf Oil Co. (AGOCO). When last covered in *Petroleum Africa's* overview, AGOCO was pumping 225,000 bpd even with two of its oil fields, the Nafoura and Bayda, closed due to power cuts or

protests. Over the past year AGOCO carried on its exploration and development activities issuing a number of tenders for drill bits, construction, and a variety of other items to keep its facilities pumping away.

The company's drilling schedule will not lay dormant if plans revealed by AGOCO chairman Mohamed Ben Shitwan are anything to go by. In a presentation in Q4 2015, Shitwan said that the company would drill 93 wells over a 10-year period. He went on to say that the new wells had a target potential in excess of 2.3 billion barrels of oil/condensate and 3.1 Tcf of natural gas. In April of this year the company revealed a discovery was made in Block 47 with the drilling of the FF2-147. The well tested at an initial flow rate of 1,892 bpd.

Not all the news from AGOCO was positive however, as it experienced attacks on facilities and production shut ins. In April NOC reported that the area adjacent to the Al-Baidha oil field was attacked, resulting in the loss of five lives. In July the company halted production at the Sarir field after a protest by oil-facility guards shut the eastern port of Hariga. Recently the GNA reached an agreement with the petroleum facilities guards (PFG) to reopen some ports in exchange for being paid back salaries. NOC was not happy with the deal and had no qualms in saying so. The state-run firm said it was a mistake to reward the PFG for the blockade of oil ports at Ras Lanuf, Es Sider, and Zueitina. According to Sanalla, the settlement would only encourage other groups to disrupt oil and gas operations in hopes of a similar pay out.

As stated previously NOC has not been sitting idle and has been meeting with a number of its JV partners to plan the future of the industry. In August the company held a technical meeting with the Waha Oil Co. which included representatives with from Marathon Oil, ConocoPhillips, and Hess Corp., as well as specialists from the Libya Petroleum Institute (LPI) and Taknia Libya Engineering. During the meeting, Waha Oil Co. presented its activities for 2016 and the work program and proposed budget for 2017. Also discussed during the meeting was the company's plan to resume production and exports. In addition to meeting with Waha, NOC has met with JV companies Mabruk Oil (Total) and Mellitah Oil (ENI), along with their partners on various fields including Statoil and Wintershall.

While Libya's current situation may appear to be dire, with production merely a trickle of its former glory, you must remember it has been in this position before and rebounded quickly. At the time of the ouster and subsequent death of longtime leader Muammar Qaddafi, Libya's production was also faltering, but companies operating there quickly set their facilities aright and flows returned to near pre-civil war status. The restoration of production happened at a much quicker pace than anyone had predicted. For the Libyan oil industry to make a repeat of this a number of things must happen, most importantly the country's numerous factions need to come together behind the GNA and oust Daesh. Only then can they work on fully restoring this once bustling industry. 

# UGANDA



Yoweri Museveni

UN photo# 645744



**President:** Yoweri Museveni  
(since January 1986)  
**Independence:** October 1962 (from UK)  
**Population:** 37,101,745 (August 2016 est.)  
**GDP (purchasing power parity):**  
\$79.88 billion (2015 est.)  
**GDP - real growth rate:** 5% (2015 est.)  
**GDP - per capita (PPP):** \$2,000 (2015 est.)  
**Minister of Energy and Mineral Resources:**  
Irene Muloni  
**Oil - production:** N/A  
**Oil - consumption:** 22,000 bpd (2013 est.)  
**Oil - proved reserves:** 2.5 billion barrels  
(January 2015 est.)  
**Natural gas - production:** N/A  
**Natural gas - consumption:** N/A  
**Natural gas - proved reserves:**  
14.16 Bcm (2015 est.)

Source: CIA FactBook July 2016

## Political and Economic Snapshot

Throughout history a host of tribes and cultures migrated into the region that is now Uganda, all leaving their indelible mark on what today makes up this modern day East African country. The European's spark of interest in the territory came as a result of forays into the region to discover the source of the Nile. British explorers stumbled across Lake Victoria as the source. Although it would take many more years before this was actually confirmed, the discovery led to the colonization of Uganda by the British until 1962 when Edward Mutesa II was brought into the role of ceremonial president upon independence. Mutesa named Milton Obote as the prime minister and four years later Obote threw out the constitution and declared himself president, bringing about an era of political instability and some bloody *coups* and rulers.

Uganda faced some horrific years following independence with *coups* and counter *coups* taking place. Perhaps the bloodiest of the country's history took place when Idi Amin Dada came to power in 1971 through a military *coup*. Idi Amin's regime was one of the most brutal in the history of Africa; characterized by human rights abuses, political repression, ethnic persecution, extra-judicial killings, and the expulsion of Indians from the country. Amin ruled until an invasion by Tanzanian forces aided by Ugandan exiles sent him packing and off into exile in 1979.

Following the ouster of Amin, Obote returned to rule Uganda but was overthrown again, this time by General Tito Okello in 1985. Okello's rule was short, lasting only six months before he himself was overthrown in a *coup* by the National Resistance Army led by Uganda's current president, Yoweri Museveni. Museveni at one time was lauded by the West as one of the 'new generation' of African leaders, although it is hard to fathom how the 'new generation' leader has managed to hang on to his position for three decades without some of the 'old generation' qualities to maintain his status. His change of the constitution in 2005 to allow unlimited term limits for the presidential office is just one of the 'old generation' tricks he has pulled; a maneuver in December 2014 by Museveni's National Resistance Movement (NRM) that added to the powers of the presidential office is another. The NRM approved a motion that would allow the NRM party chairman, Museveni, to appoint or dismiss party leaders at will, which the president took full advantage of.

Museveni took advantage of those unlimited term limits once again in 2016, winning the presidential elections in February with more than 60% of the vote. Museveni defeated opposition candidate Kizza Besigye and six others who sought to end his reign. It was thought that this election would be the toughest challenge Museveni had

seen at the polls since taking office; however, Besigye, his closest competitor, only came in with a little over half of the votes that Museveni garnered.

Besigye's party, the Forum for Democratic Change, rejected the results and demanded an independent audit of the elections. Meanwhile, Amama Mbabazi, who served as prime minister under Museveni between 2011 and 2014, came third in the presidential race with less than 2% of the vote and filed a legal complaint against the results of February's presidential election.

This was not Besigye's first go-round at trying to unseat Museveni, having challenged him in the 2001, 2006 and 2011 elections. After losing the 2011 election, he was shot by the military police and detained several times. This past October he was temporarily placed under house arrest to prevent him from holding opposition rallies. Besigye was arrested and/or detained multiple times during the week of the February 18 elections, only to be arrested again, accused of fomenting violence, and released in July. While not everyone would agree on his leadership,

Museveni has been able to bring relative stability and economic growth to the country.

Uganda is blessed with an abundance of natural resources to fuel its economic growth. The country's fertile land could feed all of the continent if it was farmed commercially. Uganda's economy improved over 2015, despite external shocks. The country is expected to see GDP growth reach 5.1% for 2016 and grow to 5.8% in 2017. The growth will be driven by industry, services, and public infrastructure investment.

According to African Economic Outlook, large infrastructure projects undertaken in the country will boost manufacturing, as well as services, most notably tourism. Rising private consumption will also drive growth. Further investment in the energy sector will also boost growth, although the pace has slowed in the past year as oil prices have fallen sharply. The issue of new licenses for further oil exploration in the greater Albertine region, once the government finishes contract negotiations with select firms, will likely attract much-needed foreign direct investment as well.

## Uganda Upstream

As another year passes, Uganda remains 'on the verge of production', 'Africa's next producer', and 'about to become a member of the producing club'. However, recent movements on an export scheme for the country's crude have brought Uganda closer to the precipice of becoming an oil producer.

In anticipation of having a booming oil and gas sector Uganda created a national oil company (NOC). The NOC was incorporated in June 2015 under the name Uganda National Oil Company Ltd. The incorporation is seen as a firm step forward after years of exploration and grumbling over issues such as tax and the kind of infrastructure the industry needs. Fred Kabagambe-Kaliisa, the permanent secretary at the Ministry of Energy and Mineral Development, described the incorporation of the company as a milestone.

Uganda's NOC will collect the country's share of petroleum received in kind, manage business aspects of state participation, and also develop in-depth expertise in the oil and gas industry. It will be run as a private company and be wholly owned by the government. Last year Michael Werikhe, the chairperson of Natural Resources Committee of Parliament, said the country opted for a private company that could run its business like any other private entity, free from the bureaucracies of government.

The Production Sharing Agreements (PSA) that the government enters into with licensed oil companies provide for government's participation through a carried interest of up to 15%. The oil firms will carry the interest for the government through the exploration and development stage. The carry ends upon the start of production when the government takes charge of its interests through the NOC. The new company is also expected to handle government's interests in the planned refinery through a subsidiary. The state will hold a 40% share in the oil refinery, which is planned to be built on a Public Private Partnership basis. Russia's RT Global Resources has been selected as the government's preferred partner for the construction of the refinery.

In addition to the creation of the NOC, the Ugandan government created the Petroleum Authority of Uganda (PAU) to regulate the industry. The PAU, according to the recently enacted Petroleum Act, is charged with monitoring, regulation of oil activities, administering petroleum agreements, and ensuring that licensed oil companies uphold laws, regulations, rules, and contract terms.

In October 2014 the government began preparing for a licensing round, forgoing its traditional direct negotiation process. Uganda offered up blocks in this licensing round, all located in the Albertine Graben. The blocks included the Ngassa in Hoima District, Taitai and Karuka in the Buliisa District, Ngaji in the Rukungiri, and Kanungu Districts, Mvule in the Moyo and Yumbe Districts together with Turaco and Kanywantaba in Ntoroko District. These blocks have both seismic and well data which were acquired by oil companies previously licensed in these areas. Stratigraphic licensing will be applicable to some of these blocks. The Ngassa, Taitai, Karuka, Turaco, and Kanywantaba blocks all saw exploration by Tullow Oil. The Mvule and the Ngaji were part of acreage held by Tower Resources and Dominion Petroleum respectively.



*Operations on Tullow assets in Uganda*

Source: Tullow Oil



Source: Tullow Oil

*Pipeyard in Uganda*

Ugandan authorities undertook resource and risk assessment of the areas proposed for licensing, developed a data room, and made available data packages to prospective investors in preparation for this licensing round. A Notice of Request for Qualification (RfQ) was issued with a closing date of June 3 and 19 RfQs were received. In August the government qualified 16 firms to submit bids for the acreage. The final bids from Uganda's first licensing effort were submitted in Q1 with the government receiving seven bids for the six exploration blocks. Four firms were invited to negotiate for five PSAs. Three of those firms are from Nigeria and one is from Australia. The Ministry of Energy and Mineral Development said it selected Nigerian firms Walter Smith Petroman Oil Ltd., Oranto Petroleum International, Niger Delta Petroleum Resources, and Armour Energy Ltd. out of Australia. "Negotiations for these PSAs is the final milestone before granting exploration rights," the Ministry said in a statement. Issues for negotiation include exploration work programs and how the financial proceeds will be shared.

Currently the only game in Uganda is the partnership of Tullow, Total, and CNOOC on EA1, EA2, and EA3A. A work program of wells, production tests, and a 3D seismic campaign that were carried out over the past several years by the partners ended in mid-2014. Progress in bringing Uganda's resources to fruition seem to continually hit road blocks. The most recent stumbling block seems to be a repeat – the route for the pipeline. This issue led to Tullow pushing back the timeline for its FID on the development of its discovered resources in Uganda. The new timeline for the FID is now in early-2017. Events over the

past several months could lead to Tullow moving the FID timeline forward a bit, but given the delays seen in developing the resources it is unlikely the FID timeline will not budge unless it is pushed back even further.

According to Tullow the delays have allowed it and its partners, Total and CNOOC, to de-risk their 1.7-billion barrel resource base in the country. The partners have benefited from adequate time to mature the definition of the Lake Albert field upstream development which is expected to have life-of field development costs, which comprises operating expenditure, capital expenditure and pipeline tariffs, of approximately \$25 per barrel. The field development plans have been submitted to the government and approval of the plans, alongside the award of production licenses, are in the works. Environmental and Social Impact Assessments are underway, and Tullow is expecting the FEED for both the upstream and pipeline developments to commence in H1 2017.

Just recently it was reported that Uganda's cabinet finally agreed to issue three petroleum production licenses to Total Exploration and Production Uganda. In a statement issued by Uganda's Information and ICT Minister, Frank Tumwebaze, it was revealed that the cabinet approved the request by Energy and Mineral Development Minister Irene Muloni to allow for the issuance of the three production licenses. The licenses are for the Ngiri, Jobi-Rii, and the Gunya. The licenses will have a duration of 25 years and can be renewed for an additional five years under Total's PSA with the government. The licenses provide that where there are oil fields which extend across boundaries of licensed areas, it's agreed that these oil fields will be developed as one unit. The FID is planned to be taken within 18 months of the issuance of the production licenses and first oil flow is expected in fiscal year 2019/2020.

Prior to Total's award of the production licenses, only CNOOC had been granted one, although it really hasn't done much with it. CNOOC seems to be taking its time on the Kingfisher oil field on Block EA-3A. According to reports, the Chinese firm is rethinking most of its earlier conceptual designs, undertaking surveys for feeder pipelines that will take the crude from the Kingfisher field to the refinery, and baseline studies for the installation facilities. Other work completed includes the collection of more data on the wells, the FEED, the layout of well pads, and analysis on central processing facilities with a capacity of 20,000 bpd.

## Uganda Downstream

To date Uganda has no downstream industry other than a retail petrol sector. While right now the downstream is virtually non-existent, the situation will change with the start of oil production as Uganda is set to get not only a refinery, but a pipeline as well.

When last covered by *Petroleum Africa* a RT Global Resources-led consortium (Russia) had been chosen to build the refinery. The planned refinery has a proposed capacity of 60,000 bpd and will be jointly owned by a subsidiary of Uganda's recently formed NOC and the private sector. The state will hold a 40% share in the oil refinery, which is planned to be built on a Public Private Partnership basis. There have been reports that could throw a spanner in the refinery however, as the

Russian consortium has reportedly withdrawn from the project, but could be enticed back given the right incentives. Specifically, the Russian firm wants tax breaks from the government.

Uganda will also be getting an export pipeline. This pipeline has caused some consternation as first it was going through Kenya to the coast and then changed to a southern route to Tanzania on Total's insistence. The route through Tanzania is thought to be the safer bet as Somali militant excursions into northern Kenya cause security concerns. Tullow had been for the northern route as it has discovered significant crude resources in Kenya that could be exported through it as well as its Ugandan crude.



*Uganda Tanzania Proposed Pipeline*

Uganda and Tanzania agreed on the pipeline route through Tanzania from the Ugandan town of Hoima to the Tanzanian port of Tanga. Both

governments are progressing preliminary discussions on ownership, legal and commercial structures, while in parallel pipeline pre-project work has continued under Total's sponsorship. Recent progress on the pipeline plan has included narrowing the route corridor to better define the exact location, further field refinement work, the appointment of legal advisors and advancing discussions on the commercial framework. Uganda and Tanzania are both actively committed to facilitating land access, as well as agreeing on favorable fiscal terms in order to move this element of the project forward.

In April of this year Uganda and Tanzania came together to determine transit fees. According to Uganda the cost of transporting its crude via a pipeline through Tanzania will be capped at \$12.20 per barrel. The engineering and design work is expected to begin in October, construction of the pipeline is due to start in 2017, and should be operational in 2020. The land acquisition operations, FEED study, and environmental impact study will of course be completed before work begins.

Besides the refinery and pipeline, a petrochemical industry may emerge in the future through the establishment of a fertilizer industry. In June African Potash signed a non-binding Memorandum of Understanding with the government to support the development of a fertilizer industry in the East African country. The firm said the agreement will seek to help ensure the availability and effective distribution of fertilizers to Ugandan farmers. 

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## Two Decades Transforming Metering and Service Delivery at ECG in Ghana

*The importance of metering to drive your utility's profitability and the benefits of customer service is evident in this ESI Africa interview with Eng. Sariel Adobea Etwire, Manager for Metering Services and the Project Manager for Advanced Metering Infrastructure (AMI) Projects for Bulk Supply Points, Distribution Transformers and Commercial and Industrial Metering at the Electricity Company of Ghana.*

*Interview originally published in Africa's power journal, ESI Africa issue 3/15 and republished with permission. www.esi-africa.com*

### ESI: How did you come to work in the energy sector?

SE: After completing my first National Service program as a teacher in a public school, I gained admission in 1990 to study BSc. Electrical and Electronics Engineering at the Kwame Nkrumah University of Science and Technology. I was the only female in the Electrical Engineering class and came out as one of the top 10 students with a second-class upper division. My male counterparts were friendly and accepted me as any other student, thus making my transition from an all-girls school to an all-male class manageable.

For my second National Service program in 1994, I was a tutor in the Electrical and Electronics Department of Accra Polytechnic where I lectured Instrumentation, Controls and Telecommunication Engineering. Towards the end of the following year, I started work at the Electricity Company of Ghana as an Assistant Electrical Engineer and have not looked back since.

### ESI: With two decades under your belt at ECG, you must have seen many changes; what projects have stood out for you?

SE: As you can imagine, I have worked on a considerable number of projects that have contributed to the changing energy and electricity environment in Ghana.

The first that comes to mind is when I led a team in the late 1990s to conduct a technical survey, energy audit of public lighting and traffic lights. The main deliverable was a comprehensive database to monitor the kWh consumed by public facilities and an assessment of its impact on ECG's technical losses.

In the same period, I undertook the assessment and approval of prospective customers' electricity service requirements. I also supervised service deliverables undertaken by third party contractors and trained staff in the customer services section on the Reviewed Service Connection Procedures.

Then in 2002, while working as a Metering Engineer, I designed work methods to ensure the integrity of our industrial customers' metering as well as instituting a comprehensive database for 800 of these customers.



*Sariel Etwire in the Meter Laboratory preparing meters and meter cubicle*

Now as the manager for the metering division of ECG my responsibilities include ensuring the overall integrity of metering systems from the Bulk Supply Points up to industrial customers through to the provision of policies, procedures and technical standards. I also manage an advanced meter laboratory used for calibration, testing and inspection of new and used energy meters.

### About Sariel Etwire, The Woman Behind ECG's Metering Transformation

*Sariel Etwire is a registered Electrical Engineer with the Ghana Institution of Engineers. She holds an MSC in Navigation and Related Application (2006), MA in Industrial Management (2003) and BSc Electrical and Electronic Engineering (1994).*

*Etwire is a member of the Women in Engineering (WINE) branch of the Ghana Institution of Engineers and currently holds the position of Manager for Metering at the Electricity Company of Ghana, since 2006.*

*Born in Akropong Akwapim in the eastern region of Ghana to Rev. Emmanuel Yirenkyi Addo and Mrs. Lydia Addo, both of blessed memory, Etwire is the second child of five siblings. She is married to Eng. Andrew Etwire of PowerWorld Ltd. Ghana and has three children, Evangeline, Giftie and Emmanuel.*

*Etwire's favorite subject at school was mathematics and she graduated as the best science student for the school in 1989. She has been working for the Electricity Company of Ghana since November 1995 and is a corporate member of the Ghana Institution of Engineers.*

I frequently facilitate the training and employee development of technical staff on meter data analysis and other related activities.

**ESI: Who were your mentors and how did they inspire you in the choices you made?**

**SE:** My mentors were my late father and mother. My father discussed my career path and encouraged me to pursue my dreams; he supported me financially and emotionally. He was the first Glass Blowing Technologist in Ghana. My father, however, did not live to see me pursue my engineering career. He died in May 1995 a few days after my BSc Electrical Engineering graduation ceremony, but his words of encouragement continue to inspire my work.

My mother was very proud of me as a female engineer and continuously encouraged me to be a role model. Her words of encouragement were mainly from Titus 2:7 – “Show yourself in all respects a model of good deeds, and in your teaching show integrity, gravity and sound speech...”

**ESI: Are there enough women in the power industry?**

**SE:** The number of women in the power industry has been on the increase; however, I believe they still represent a minority. In my company, only three women engineers are at the managerial level with 8% of the population of engineers in the company being women. On the other hand, 30% of non-technical customer service related activities in the company are undertaken by women.

**ESI: Should gender matter?**

**SE:** Not really. What matters is one’s job satisfaction and ability to impact positively on the country’s socio-economic aspirations. I see a successful engineer as one who dreams of delivering a reliable product or quality service, and who enjoys working towards providing that service for the benefit of everyone.

However, with that said, it is my opinion that women make good engineers because of their inherent qualities, which include a sense of discipline, thinking outside the box and aesthetic skills.

**ESI: What have been the most important decisions for you in entering the power industry?**

**SE:** My choice to study Electrical and Electronics Engineering at the university and then a discussion I held with my father and his friend working as a manager of ECG. These discussions cleared my anxieties about working in the energy sector as a female engineer.

It became clear to me that women’s needs are respected, that study leave and maternity leave are available, and that there are both white- and blue-collar jobs for all ages. In fact, in October 2001, ECG granted me a study leave to pursue a Master’s Degree in Industrial Management at the KNUST, in Ghana.

It is important to stay abreast of developments and improve your skills. Thus, in 2005 I gained a USAID sponsorship to study an



*Sariel Etwire and family*

MSc Program in Navigation and Related Applications at Polytechnico Di Torino, Italy. As part of the program I researched into the Development of GIS (Geographical Information System) for Asset Management of a Utility Company using GPS (A Case Study of ECG).

Sharing the knowledge gained from my MSc program I undertook a two-year part-time lecturing role at the Regional Maritime University where I taught courses in Instrumentation and Control, Electrical Measurements and Instruments, and Control Systems.

**ESI: What have been your successes that have had a positive influence in the sector?**

**SE:** My successes have mainly been in the management or supervision of turnkey projects at my company, ECG. For instance, in 2001, I supervised 15 third party contractors and 30 staff in a massive decentralized deployment project to replace existing meters with a prepayment system for 80,000 customers, with a combined monthly revenue of over \$100,000.

In 2005, we completed an expansive Metering Improvement Project to curb losses in the industrial sector. This project covered about 800 industrial customers, which yielded about \$1 million in revenue from rectification and analysis of metering anomalies and the restructuring of operations for better meter installation practices.

Another project that had a significant impact was in 2014, for the upgrade of 1,000 sub-standard metering systems and the deployment of AMI for 3,000 commercial and industrial customers. This turnkey project led to the recovery of 99 million KWh and \$10 million lost revenue and the curtailment of over \$800,000 per month. The benefits derived from this project include an effective 24-hour remote monitoring system, and the prompt and easy access to electronic metering data for billing and various data analysis.

Out of my desire to satisfy customers, we developed a custom-made Internet based customer portal for our distinguished customers, leading to better understanding of the electricity usage, electricity availability and how their bills are generated. This platform has resulted in a drastic reduction in disputes received from customers.

**ESI:** What projects are you currently busy with and what will these hopefully achieve?

**SE:** Currently I am managing three turnkey projects in my company with the ultimate goal to further reduce our commercial and technical losses as well as improve system reliability.

The projects are a \$10 million Boundary Bulk Metering Project, a \$6 million Primary Station and Distribution Transformer Metering Project, and a \$4 million AMI Metering Project for Commercial and Industrial Customers. The impact of these projects is enormous and has reduced our commercial and technical losses as well as improving system reliability.

The AMI project has unearthed over 102 million kWh leaked energy representing over \$10 million and curtailed a monthly energy leakage of over 3 million kWh. The system still effectively monitors the metering systems for quick detection and rectification of the anomalies.

The metering project for distribution transformers is currently at the integration stage with our GIS and billing system for energy balance analysis. This, we are optimistic, will generate reports on Distribution Transformers with high percentage losses for direct loss reduction interventions.

In addition, the bulk metering project ensures the integrity and monitoring of our energy purchases across ECG administrative boundaries. It also enables the company to assess the performance of loss reduction programs after their completion.

There is also a personal project that I have undertaken where I am currently mentoring 28 electrical engineers, five of whom are women.

**ESI:** What are your top three predictions for the energy market in Africa in the next five years?

**SE:** The energy sector is a vibrant place to be right now, and I predict that there will be an increased level of partnership between utility companies and telecommunication service providers for turnkey metering operations on loss reduction programs.

Further to this, the sector will experience an increase in mini renewable sources of energy generated by consumers (the advent of pro-sumers) to augment the deficiencies in the national energy grid. There is bound to be an escalation in Private Sector Participation (PSP) interest in the service delivery department of utilities.

**ESI:** What is your personal vision for this industry in Ghana as well as for Africa?

**SE:** To have effective and visionary leaders in the energy sector. For the management and staff of utility companies to understand the dynamism of the energy industry and then to turn the industry into a profitable business venture with satisfied customers. Through delivering on the projects in my portfolio, I believe this vision is possible to achieve.



**ESI:** What has surprised you about being a woman in the energy sector?

**SE:** My initial perception that the energy sector predominantly required menial skilled labor, rather than analytical skills was incorrect.

When I started out in the sector, I effectively combined field activities with my analytical skills. As I progressed in my profession more analytical skills, leadership skills and human relationship interventions were strategic to my achievements.

I therefore encourage more women to enter the energy sector since the ultimate goal is excellent customer service delivery, regardless of the environment in which you will operate.

**ESI:** When you retire, what legacy do you wish to leave behind?

**SE:** The legacy I wish to leave behind when I retire are several journals on metering, an industry handbook on metering and a resilient, divested and user-friendly metering infrastructure package for utilities to replicate. Currently very few stakeholders in the energy sector understand and appreciate the potential of metering as a strategic tool.

**ESI:** Last words of encouragement for women wanting to enter the energy sector?

**SE:** Ladies, this sector now engages non-technical staff due to the focus on good customer service delivery and this trend has come to stay. I encourage you to take up any opportunities offered in engineering and technical fields as there are white-collar jobs now in the industry to accommodate the special needs of women, such as maternity leave. Reach out to women who are already in the marketplace who can guide you to become successful in this sector. 

## Women in Power and Energy Luncheon – West Africa

West African Power Industry Convention (WAPIC) together with Power Africa and PowerForAll along with African Development Bank is proud to host the “Women in Power and Energy Luncheon – West Africa” (by invitation only).

Power Africa’s Women in Africa Power network and WAPIC are hosting a luncheon highlighting the role of women in Africa’s energy sector. Women in Africa Power aims to shine a light on both the role that women currently play in Africa’s energy sector, and the tremendous potential they hold to shape a vibrant and growing sector. This luncheon will provide a platform for networking, information exchange and exposure to new business opportunities.

To be part of the luncheon please contact Yolisa Nyoka: [Yolisa.Nyoka@Spintelligent.com](mailto:Yolisa.Nyoka@Spintelligent.com).

Independent E&P Companies				
Company	Ticker Symbol	Currency	One-month Percent Change	Price as of Aug 22
Groundstar Resources	GSA.V	CAD	75.00%	35.00
Aminex plc	AEX.L	GBP	43.20%	2.02
Maurel et Prom	MAU.PA	EUR	40.40%	3.99
ADX Energy	ADX.AX	AUD	-16.60%	0.005
Cobalt International Energy	CIE	USD	-15.17%	1.23
Madalena Ventures	MVN.V	CAD	15.15%	0.14

### Cobalt to Market Angola Stake

During a meeting between Cobalt International Energy's CEO Tim Cutt, and Sonangol Chairwoman Isabel dos Santos, it was decided that instead of the state company acquiring a 40% stake in Blocks 20 and 21 as previously agreed upon, Cobalt will now market the stake to sell to a third party.

According to the US independent, it received a letter from dos Santos on August 1 confirming Sonangol's support of such a marketing and sale process. Given this agreement to market Cobalt's interest in Blocks 20 and 21, it is unlikely that the sale transaction between Cobalt and Sonangol will close pursuant to the terms of the August 2015 Purchase and Sale Agreement, and therefore it is likely the Purchase and Sale Agreement will automatically terminate on August 22.

Cobalt is currently preparing a data room for its Angolan assets and will immediately commence the marketing and sale process.

Commenting on this Angola sale update, Cutt said, "Although we would prefer the transaction with Sonangol to close, I am pleased that we can remarket these attractive liquid rich assets to third parties. The development cost environment has improved substantially, the fundamentals for medium to long term liquids pricing remains strong and we have delivered two new discoveries on Block 20."

### ENI, Saipem and Scaroni Ordered to Stand Trial in Algeria

ENI, Saipem, and former ENI CEO Paolo Scaroni will be standing trial in Algeria on corruption charges as ordered by an Italian judge.

The corruption case revolves around allegations that Saipem paid intermediaries around €198 million for contracts with Algeria's state-owned Sonatrach worth an estimated €8 billion.

According to Saipem the allegations relate to happenings at the start of 2010.

Both ENI and Saipem issued statements saying they were confident that the allegations would be proved groundless.

### Lufthansa Takes You to Africa

Travel to Africa just became a little easier. The Lufthansa Group airlines which include Lufthansa, Austrian Airlines, Brussels Airlines, and SWISS have integrated Africa's most important growth markets into their worldwide route network.

Lufthansa has more than 35 destinations on the continent with over 600 connecting weekly flights. Connections into Africa can be accessed from 10 regional airports.

### South Sudan Turns to China for Funding

South Sudan is looking for funding from China. According to the country's foreign affairs minister, Deng Alor, the government plans to ask China for a \$1.9 billion loan. The loan is to be used for infrastructure projects such as roads and bridges.

"We (usually) present a list. Anything below \$40 million, we ask the Chinese government for it to be a grant and anything above \$50 million to be a concessional loan. So we are asking for \$1.9 billion," Alor told a news conference in the capital Juba. "We want to focus and use this money, the loan that we are going to get from China, on infrastructure like roads, bridges."

Alor did not give more details on when the money was expected to be disbursed.

### WEC Takes Stake in Industrial Cooling Firm

WEC Projects (Pty) Ltd., a contractor specializing in turnkey water and wastewater treatment solutions in South Africa, acquired a majority

stake in Industrial Water Cooling (Pty) Ltd. (IWC), a company specializing in cooling tower and industrial cooling solutions. The partnership is effective immediately and replaces private equity company, MEDU Capital's stake in IWC.

"I am very pleased to announce that we have a new business partner in WEC Projects. I am of the firm belief that in WEC we have found a like-minded business partner that understands the contracting environment in which we operate," comments Roger Rusch, Managing Director of IWC.

Johannesburg-based WEC Projects has been operating as a contractor in the water and wastewater treatment industry since 2002. The company specializes in designing, manufacturing, and installing water and wastewater treatment plants, such as packaged potable water treatment plants, sewage treatment plants, industrial filtration plants, submerged membrane bioreactors, reverse osmosis plants, reverse osmosis pre-treatment systems, dissolved air floatation devices, and lamella settlers.

WEC Projects are also pioneers in biogas to energy technology, having designed, supplied and installed South Africa's first such plant at a municipal wastewater site. The technology converts wastewater sludge into biogas that is then used to fuel a gas engine that produces electricity. As a result of this technology, municipalities are able to subsidize their electrical costs by what they are able to produce themselves, utilizing a waste material that now has significant commercial value.

### Algeria's Forex Dropping ala Oil Price

Low crude prices have caused Algeria's foreign exchange reserves to dip. According to Abdelmalek Sellal, the country's prime minister, foreign exchange reserves are expected to drop to \$116 billion by the end of 2016.

The government is making further cuts in spending, with its budget seeing a 9% cut for 2016. The budget cuts are mainly affecting much needed infrastructure projects.

The North African country's reserves dropped \$6.1 billion to \$136.9 billion in the first five months of 2016.

"State policy will not be directed towards austerity, but there will be a decrease in spending," Sellal said, according to the state news agency APS. He did not give details on future cuts.

Drilling & Service Companies				
Company	Ticker Symbol	Currency	One-month Percent Change	Price as of Aug 22
Prosafe	PRS.OL	EUR	42.30%	0.74
Newpark Resources	NR	USD	29.30%	7.40
Helix Energy Solutions	HLX	USD	18.40%	7.95
Tidewater	TDW	USD	-31.70%	3.20
Atwood Oceanics Inc.	ATW	USD	-28.60%	8.35
Noble Corp.	NE	USD	-26.00%	5.97

## SIR Asks Government to Take on its Crippling Debt

Cote d'Ivoire's SIR refinery has requested that the government take on debts that are keeping it from turning a profit despite record output. SIR hit a 30-year production record of 3.45 million tons of refined products in 2015 and output is on track to rise further in 2016, Thomas Camara said.

Oil and Energy Minister Adama Toungara told reporters that he expected the government to take a decision in the next few days., but at time of press there had not been further word.

The refinery contributes the majority of the West African country's refined petroleum products and allows for exports to neighboring countries.

## ExxonMobil Outbids Oil Search for InterOil

ExxonMobil has topped Oil Search's bid for InterOil, offering \$2.2 billion for the company that holds the large natural gas reserves in Papua New Guinea. The move pits the US supermajor against French firm Total who is backing the Oil Search bid for InterOil. Oil Search had until July 21 to up the ante.

Upon receiving ExxonMobil's unsolicited proposal, InterOil's board of directors, after consultation with its legal and financial advisors, determined that the ExxonMobil offer constitutes a "Superior Proposal," as defined in InterOil's arrangement agreement with Oil Search Ltd. and InterOil has provided notice of such determination to Oil Search.

Under the terms of the ExxonMobil Offer, InterOil shareholders would receive a payment of \$45.00 per share of InterOil, paid in ExxonMobil shares. The number of ExxonMobil shares paid per share of InterOil would be calculated based on the volume weighted average price of ExxonMobil shares over a measuring

period of 10 days ending shortly before the closing date.

There would also be a contingent resource payment (CRP), which would be an additional cash payment of approximately \$7.07 per share for each Tcfe gross resource certification of the Elk-Antelope field above 6.2 Tcfe, up to a maximum of 10 Tcfe. The CRP would be paid on the completion of the interim certification process in accordance with the Share Purchase Agreement with Total SA, which would include the Antelope-7 appraisal well. The CRP would not be transferrable and would not be listed on any stock exchange.

## Golar LNG and Schlumberger Form OneLNG

Golar LNG and Schlumberger have come together to form the OneLNG<sup>SM</sup> JV. The JV was formed with the aim of rapidly developing low cost gas reserves into LNG.

The combination of Schlumberger reservoir knowledge, wellbore technologies and production management capabilities, with Golar's low cost FLNG solution, will offer gas resource owners a faster and lower cost development thereby increasing the net present value of the resources. Golar and Schlumberger have a 51/49 split in the ownership of the JV. The two have agreed to an initial investment commitment to cover the estimated equity needed to develop the first project. In addition, the parties will on a project-by-project basis discuss additional debt capital as required. This future financing will take into account Golar's FLNG intellectual property through an equitable contribution mechanism to be agreed between the parties.

OneLNG will be the exclusive vehicle for all projects that involve the conversion of natural gas to LNG which require both Schlumberger Production Management services and Golar's FLNG expertise. After reviewing the current

market opportunities where 40% of the world's gas reserves can be classified as stranded, both parties are excited at the future prospects of OneLNG and are confident that it would conclude five projects within the next five years.

## SDX Completes Second Tranche of its Private Placement

SDX Energy completed the second tranche of its private placement. The second tranche consists of 3,910,000 common shares that had been placed with an investor conditionally upon the receipt of final acceptance of the transaction by the TSX Venture Exchange, which has now been obtained. Admission of the placement shares to trading on AIM and the commencement of dealings took place on July 28. The subscription price was 18 pence (C\$0.33) per placement share.

For the purposes of the UK Disclosure and Transparency Rules, the total number of voting rights in the company will be 79,843,902.

## Hess Wants Compensation from Schlumberger

Hess Corp. could pursue legal action against Schlumberger over a defective valve for one of its GoM oilfields. The company is looking for as much as \$40 million as recompense for the bad valve that led to three wells being shut in, lowering its production flows from the field.

Hess announced its litigation plans in its quarterly earnings conference call, publicly mentioning Schlumberger and decrying the quality of service and parts provided.

"It's extremely disappointing," Greg Hill, COO at Hess said on the earnings call of the alleged defective valve.

Hess claims it is owed between \$30 million and \$40 million in remediation fees, attorney fees and lost profit from the shutdown of some wells at its Tubular Bells field. Originally only two were shut in but during a routine maintenance check a third was shut in.

As a result, Hess slashed its production outlook from the Tubular project to about 10,000 boepd for the year, down from previous estimates for at least 25,000 boepd.

"It relates to some quality control and some of the components of the valve," Hill said in the conference call.

## New Strike Threat for South Africa 8315

Two unions in South Africa launched strikes in over the past month. The first was the Chemical,

## Major E&P Companies

Company	Ticker Symbol	Currency	One-month Percent Change	Price as of Aug 22
ConocoPhillips	COP	USD	1.30%	42.31
Total	FP.PA	EUR	-1.20%	42.47
BP	BP.L	GBP	-4.10%	427.31
Royal Dutch Shell	RDSA.L	GBP	-8.90%	1887.00
ExxonMobil	XOM	USD	-7.80%	86.85
ENI	ENI.MI	EUR	-6.10%	13.42

Energy, Paper, Printing, Wood and Allied Workers Union (CEPPWAWU). The union, which refinery workers belong to, began its strike on July 28.

The second was the National Union of Mineworkers (NUM). The union launched a strike against Eskom on August 8, demanding a wage increase from the state-run utility firm. While Eskom was in arbitration with NUM, the union was not pleased with the offer Eskom made to its workers.

In an effort to avoid a strike Eskom received an injunction from a South African court, which

stated that the strike was illegal. The workers from NUM launched their strike anyways with one of its leaders saying the union members had a right to strike and the law was "no barrier."

The union is said to have reduced its salary demands from 13% for the lowest paid members from 18% and to 12% from 16% for the rest. Eskom is offering 7%.

After a 14-hour marathon of negotiations NUM signed a wage increase of between 8.5% and 10%, with the lowest paid workers getting a 10% pay raise for the this year. In the second year, all

workers will receive a pay raise of 8% they said. It should be noted that not all unions on strike participated in the Eskom negotiations.

### Lamprell to Pay Enesco for Delays in Jack Up Delivery

Lamprell will be paying remedial costs and liquidated damages to Enesco for the delay in delivering the jack up ENSCO 140. The ENSCO 140 is a Le Tourneau designed, Super 116E (Enhanced) Class mobile offshore drilling unit.

Lamprell signed an agreement with the client to settle all claims arising from the late delivery of the rig, including a \$25 million deduction from the final milestone payment. The firm will also provide additional services for ENSCO 140 and ENSCO 141 (now under construction at Lamprell's yard) including temporary storage.

An extended warranty for the jacking equipment supplied by the original equipment manufacturer, Cameron Le Tourneau will also be provided.

The delay was caused by failures in the jacking equipment that Cameron supplied. Lamprell plans to recover the remedial costs arising from the technical defects in the jacking equipment from Cameron as well as seeking compensation from the latter.



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**Christophe Poillion**  
Chair of the GIE Security of  
Supply Task Force  
GIE

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## World's Largest Semi-Sub Delivered into Class

DNV GL welcomed the world's largest semi-submersible drilling rig into class recently. The *Ocean Greatwhite*, is 123 meters long and 78 meters wide and was delivered by Hyundai Heavy Industries.

The *Ocean Greatwhite* is owned by Diamond Offshore and will be put to work offshore Australia under contract to BP.

The rig is to be a new design MOSS CS60E high specification state-of-the-art semi-submersible drilling unit suitable for operations in harsh environments, which is the first MOSS CS60E and the largest rig in the world.

*Ocean Greatwhite* is also the first new-build rig to receive the DNV GL Integrated Software Dependent Systems (ISDS) notation. ISDS are systems whose performance is dependent on the overall behavior of their integrated software components. DNV GL's ISDS standard helps owners and operators minimize software integration errors and delays in projects involving complex integrated systems.

The certification ensures that software and integration issues are identified and resolved early on during the project design stages. It also represents a new approach to verification, as it emphasizes a review of the working methods and processes that lead to the delivery of the systems, rather than simply focusing on the final review of documents and installations to ensure they meet product requirements.

## Range Well Reaches Targeted Depth in Trinidad

Range Resources' QUN 159 well spud on August 8 in Trinidad has reached the targeted depth of 2,500 ft. The well, located on the Morne Diablo field, was the third development well drilled by Range in Trinidad this year.

The well was targeting the Lower Forest and Upper Cruse horizons. Preliminary analysis of the well indicates approximately 40 ft net oil pay.

The program to perforate the well has been approved by the government and Range intends to proceed with production testing of the well during early September.

Production testing on the two previously drilled development wells (MD 250 and MD 251) is also underway. All three wells are expected to be brought into production during Q3 2016.

## Petronas Awards Bell Geospace and Onyx FTG Survey

Bell Geospace and Onyx Engineering were contracted by Petronas for work in Malaysia. The contract is for a 3D multi-client FTG data acquisition, processing and interpretation services. The data acquisition will cover approximately 198,900 sq km.



Source: Bell Geospace

The provision of airborne FTG and magnetic surveys will be undertaken over offshore Peninsular Malaysia, Sarawak, and Sabah. It will commence subject to pre-funding requirements and approval by Petronas.

Bell Geospace will provide a variety of expert services for the project. This will allow current petroleum arrangement contractors and potential bidders seeking new exploration blocks to quickly identify prospective areas for quick and efficient understanding of complex sub-surface geology.

## Iraq Reaches Investment Deal with Three IOCs

The government of Iraq and three international oil and gas firms have reached an agreement that will see a restart of activities at certain fields. The agreement reached was with BP, Lukoil, and Shell to restart investments at oil fields which the firms had halted development activities at earlier this year.

The agreements effectively delay to H2 activities that the three companies had planned to carry out in H1, which had been suspended because of low oil prices.

BP has agreed to spend \$1.8 billion this year at the Rumaila field it operates, Shell will spend \$742 million, and Lukoil will spend \$1.08 billion.

## Indonesia Invites Petronas to Explore

Petronas was offered to explore 10 oil and gas fields in Indonesia, according to Indonesia's Deputy Prime Minister Ahmad Zahid Hamidi. The invitation involved seven exploration blocks in the Exclusive Economic Zone and three in

Natuna Island and was made by Indonesia's Coordinating Minister for Maritime Affairs Luhut Binsar Panjaitan.

While speaking at a press conference Hamidi said Petronas had the opportunity to participate in the open tender by Pertamina, Indonesia's state-owned oil company, for the exploration of new blocks in other locations.

## Ashstead Deploys New DMS for BP's Quad 204 Redevelopment

Ashtead Technology successfully completed a subsea integrity management project to support BP's Quad 204 redevelopment of the Schiehallion and Loyal fields, West of Shetland. Ashtead deployed its new Deflection Monitoring System (DMS), to capture critical data required to safely deploy and install two subsea manifolds at water depths of 400 meters. The technology was launched to the market earlier this year.

The system monitors deflection, heading, pitch, roll, depth and other parameters of subsea structures in real time. This allows informed decisions to be made during critical operations, ensuring specified tolerances and safety requirements are taken into account.

The DMS was optimized to the exact pressures and water depths required for the scope of work at Ashtead's UKAS accredited calibration laboratory before it was launched from a vessel and lowered 400 meters onto the seafloor.

The project was completed on time and allowed the subsea manifolds to be installed within 24 hours of the DMS being deployed. The entire project was controlled remotely via radio frequency and acoustic data links, removing the need for direct ROV or diver support intervention in order to gather attitude measurements.

Ashtead utilized a range of communication and positioning tools to enhance the accuracy of data collected and to ensure maximum performance of the subsea structure once in place. According to the firm, this new approach to the installation and integrity management of subsea systems was developed by Ashtead Technology as part of its range of value-added services to significantly reduce risk and cost in subsea operations.

## Iran to Invite Bids in October

Iran plans to invite international oil companies to submit bids in October under the long-awaited new contract model for industry investment. The tender comes as the country looks for new investment to boost its output.

The government will invite companies to bid to develop the South Azadegan field on Iran's southwestern border with Iraq. The invitation to bid will take place during the week of October 14-20 according to state news agency IRNA. The company expects to sign three contracts worth a total of \$10 billion by March 2017.

### Apache Declares Huge Find in Texas

Apache has made what it says is a huge discovery on its Alpine High acreage in the Delaware Basin of Texas. The company said that after more than two years of extensive geologic and geophysical work, methodical acreage accumulation, and strategic testing and delineation drilling, it could confirm the discovery of a significant new resource play, the "Alpine High."

Apache estimates hydrocarbons in place on its acreage position are 75 Tcf of rich gas and 3 billion barrels of oil in the Barnett and Woodford formations alone. Apache also sees significant oil potential in the shallower Pennsylvanian, Bone Springs, and Wolfcamp formations.



Alpine High

Source: Apache

Apache has drilled 19 wells in the play, with nine currently producing in limited quantities due to infrastructure constraints. This includes six wells in the Woodford, one well in the Barnett and one well each in the shallower Wolfcamp and Bone Springs oil formations. The Alpine High play contains a large inventory of repeatable, high-value drilling opportunities with thousands of low-risk locations in the Woodford and Barnett formations alone.

### D3 Awarded Decommissioning Job in the North Sea

D3 Consulting was awarded a six figure contract with an unnamed major operator, following the successful completion of a decommissioning project with another operator. The eight-month contract started in April 2016 and involves the preparation of materials inventories for 21 platforms in the southern North Sea, with eight associated subsea installations and pipelines.

The work scope includes the quantification of assets with subsequent characterization and classification of the waste and materials.

The company will utilize its unique Decommissioning Assurance through Waste Knowledge (DAWN) system, the world's only

information management system for preparing materials inventories and managing waste throughout the decommissioning process. Martin continued: "As market leaders in offshore decommissioning materials inventories, we are typically engaged at the front end planning and engineering phase of decommissioning operations."

### Polyard's Philippines Well Completes Testing

Polyard Petroleum's Polyard-3 well completed oil testing on August 25 on the SC49 Block in the Philippines. The company said that testing indicates that the main target intervals attain steady oil production of 235.3 bpd and gas production of 9,022 cubic meters/d.

The Polyard-3 well will be converted into a production well and will commence production in the short term.

The well had a planned depth of 1,508 meters, although the actual depth was 2,118 meters. The well was drilled to appraise the potential of the upper Maingit Sandstone and lower Maingit Limestone in the Alegria Anticline, with the aim of acquiring key hydrocarbon reservoir parameters which will provide a reliable basis for future development plan and oil production.

### PDVSA and ENI Agree on Campo Cardon IV

During a meeting between Venezuela's state-run PDVSA and Italian firm ENI, the necessary conditions to develop infrastructure to produce gas and condensate from Campo Cardon IV were agreed upon. The Campo Cardon IV, located in the Gulf of Venezuela, currently produces at a rate of 500 Mmcf/d and 15,000 bpd of condensate in its Phase 1.

PDVSA said that "joint actions defined by both oil companies will determine the resources to commit in the development of this project in its Phase 2, whose construction contracts will be signed after all terms have been established."

As part of the meeting the two companies discussed strategic elements of the project, trade aspects related to supply contract, internal market requirements and export mechanisms related to initiatives of energy integration in Latin-America and the Caribbean, among other prominent issues.

### Well Plugged and Abandoned Offshore Italy

Zenith Energy completed the plug and abandonment of a platform well located offshore

Italy. The company provided well engineering and project management services to Rockhopper Exploration, successfully completing P&A of the Ombrina Mare development well.

Utilizing its experienced well engineering personnel, well delivery process and HSEQ management systems, Zenith Energy completed the project safely and within AFE, using the *Atwood Beacon* jack up MODU.

The operation involved re-entry to the existing well situated on an unmanned platform, bullheading operations, removal of completion, casing and wellhead equipment, and the setting of permanent barrier cement plugs.

### Halladale/Speculant Project Brought Online by Origin Energy

Origin Energy revealed that it has brought its 100% owned offshore Halladale/Speculant fields in the Otway Basin online. The Halladale/Speculant project is expected to boost production at the Otway Gas Plant by up to 80TJ/d.

The project involved drilling from a land base site to access offshore reservoirs locations five km off the coast in the Otway Basin, the construction of the new 33-km Halladale/Speculant pipeline, connecting the well site to the Otway Gas Plant.

### Keppel On Track to Deliver Armada Kraken

Keppel Offshore & Marine reported that it is on track to deliver a FPSO vessel to Armada Kraken, a wholly-owned subsidiary of Bumi Armada. The naming ceremony of the FPSO, *Armada Kraken*, was held at Keppel Shipyard.

*Armada Kraken* is a harsh-environment FPSO unit that is designed for operations in the North Sea under a stringent regulatory regime. The FPSO vessel, which has a design life of 25 years without dry-docking, will be deployed to produce the heavy oil (14° API) found in the Kraken field in the UK sector of the North Sea.

Keppel Shipyard's work scope for the *Armada Kraken* project includes refurbishment and life extension works, upgrading of living quarters to accommodate 90 personnel, installation of an internal turret mooring system as well as the installation and integration of topside process modules.

*Armada Kraken* is able to handle a peak fluid rate of 460,000 bpd of crude, 20 Mmcf/d of gas and has a storage capacity of 600,000 bpd.

## No Confidence Vote for Essid in Tunisia

Tunisia's Prime Minister Habib Essid received a vote of no-confidence from the parliament. Essid has not made a lot of progress in seeing Tunisia's financial reforms put into action. He has also been unable to create growth or generate employment opportunities during his two years in office.



Habib Essid

Out of those members that voted, only three voted to support Essid and 118 voted to oust the prime minister.

It is expected that a new premier will be named after negotiations within the ruling coalition of four major parties; this may include a change in cabinet with a new prime minister.

## Sao Tome & Principe Vote Carvalho in as President

The citizens of Sao Tome and Principe (STP) have elected former prime minister Evaristo Carvalho in as president during the runoff election after incumbent Manuel Pinto da Costa dropped out of the race citing voting irregularities in the first round.

Carvalho won 42,058 votes in the August 7 poll according to the National Electoral Commission (CEN). Only 46% of voters cast their ballots and of those, nearly 20% turned in blank or invalid ballots, said CEN chairman Alberto Pereira.

## Libya Round-Up

Just when there is some positive news out of Libya, such as the oil export terminals reopening, the country gets hit with something else. On August 2 a car bomb targeting security forces in Benghazi killed 22 people and wounded an additional 20.

According to reports from the beleaguered North African country, the blast occurred in a residential area in the Guwarsha district, the scene of fighting between security forces loyal to Libya's eastern government and Islamists.

Earlier that same week, airstrikes ordered by US President Barack Obama against Daesh (ISIS) targets in Libya were launched. The airstrike came at the request of Libya's Government of National Accord (GNA) to help push the militants from the city of Sirte.

Prime Minister Fayez Seraj said on state TV that the Presidential Council of the GNA had decided

to "activate" its participation in the international coalition against Daesh and "requested the US to carry out targeted air strikes on Daesh."

"I want to assure you that these operations are limited to a specific timetable and do not exceed Sirte and its suburbs," he said, adding that international support on the ground would be limited to technical and logistical help. The airstrikes targeted a specific tank location and two militant vehicles that posed a threat to GNA forces.

## Egyptians Need to Prepare for Tough Economic Measures

Speaking at a young leadership conference Egypt's president, Abdel Fattah al-Sisi, warned that tough measures would be needed to turn the country's economy around. Sisi's words were a bid to prepare Egyptians for a series of measures, including the ever unpopular subsidy cut, to weather the country's current economic storm. "The problem is whether public opinion is prepared to accept the measures which could be tough or harsh," he told young people at the conference. "Egyptians love their country and are able to face hardship but they are too busy with their daily lives and thus must be afforded the correct information regarding the measures."

Currently the government is negotiating a \$12-billion loan program with the IMF. It hopes to finalize the IMF deal before the end of August.

## Nigerian Air Force Bombs Militants

In late July Nigerian troops began a build up in the Niger Delta in preparation to use force against militants if peace talks failed. Most Nigerian government officials maintain that force cannot be ruled out if negotiations do not pan out.

The Nigerian Air Force (NAF) began an aerial assault against militants in the Arepo area of Ogun state. The air assault started on July 28, with another taking place on July 30. According to reports from residents in the area, the first air assault was carried out by a NAF helicopter which released four rockets towards the militants' base located on a large island behind the area. Residents could also hear the sound of heavy machine gun fire. The helicopter operation was followed by a jet dropping bombs on the militant camp.

## Cote d'Ivoire to Hold Referendum on New Constitution

Cote d'Ivoire's parliament voted to hold a referendum on a new constitution. The motion to hold a referendum was approved in the National

Assembly with 233 votes in favor and six against. Seven lawmakers abstained.

Among other measures that would be removed from the constitution is the controversial nationality clause. The clause states that presidential candidates must prove that both parents are natural born Ivoirians. It also states that they must have never claimed citizenship of another country.

Through the referendum, President Alassane Ouattara is looking to create the new post of vice-president to take over and complete the president's term if he were incapacitated or died in office. As it stands now, the speaker of parliament is second in line to the presidency.

## Congolese Take to Streets Against Kabila

In the DRC capital of Kinshasa, tens of thousands of Congolese took to the streets demanding Joseph Kabila step down as president in November. Kabila has been in power since his father, Laurent-Désiré Kabila, was assassinated in 2001. The younger Kabila has been under extreme pressure to step aside and call elections to choose a successor.

Kabila's government has said logistical problems are likely to delay the poll and his supporters have suggested a referendum scrapping term limits so he can run again, as several other African leaders have done. He retains a solid level of support. His opponents, however, suspect Kabila is simply trying to cling to power.



Joseph Kabila

"We're sick of Kabila," Philippe Lukusa an unemployed demonstrator was cited as saying in a *Reuters* report. The people in the streets want opposition leader Etienne Tshisekedi as their leader. A favorite of the citizens of the DRC, Tshisekedi's supporters lined the streets for miles when he returned home after almost two years in Belgium for medical treatment.

## Ethiopia Denies UN Observer Request

Protests raged in Ethiopia during early August, leading to scores of protesters dying at the hands of security forces. During the anti-government protests in the regions of Oromia and Amhara at least 90 were killed. In light of the anti-government protesters' deaths, the UN asked to send international observers to investigate but

the Horn of Africa nation's government denied the UN's pleas.

According to Getachew Reda, a government spokesman in an *Al Jazeera* report, the UN was entitled to its opinion but the government of Ethiopia was responsible for the safety of its own people. Zeid Raad Al Hussein, the UN High Commissioner for Human Rights, said allegations of excessive use of force must be investigated and that his office was in discussions with Ethiopian authorities.

### Kiir Replaces Machar

There is a good chance that South Sudan could see more fighting between government troops and rebel troops loyal to Riek Machar. Salva Kiir, South Sudan's president, replaced his VP and rival Machar on July 25.

Machar was sworn in as first vice president in April in an attempt to end the fighting between Kiir's government troops and Machar's rebel troops; however, the rivalry between the men led to violence erupting once again between the two factions.

Machar left Juba with his troops, saying he would only return when an international body had set up a buffer force between his fighters and those supporting Kiir. On his part the president issued Machar an ultimatum demanding that he contact him and return to Juba or face replacement; apparently Machar chose to be replaced. Kiir issued a decree on July 25 "for the appointment of the first vice president of the republic of South Sudan" naming General Tabal Deng Gai to the post.

At a meeting held in the Ethiopian capital of Addis Ababa on August 6, the leaders from the Intergovernmental Authority on Development (IGAD) recommended both that Machar be reinstated and that a regional peacekeeping force should be deployed to protect civilians as part of an effort to ensure the full implementation of last year's peace accord signed by President Kiir and Machar.

### TICADVI Summit Results in Nairobi Declaration

The TICADVI summit attracted over 30 heads of state from Africa and 100 chief executive officers from Japan representing top Japanese companies. The summit was anchored on the theme of "Advancing

Africa's Sustainable Development Agenda and, "Partnership for Prosperity."

Following the successful summit, the Nairobi Declaration and its Implementation Plan were adopted unanimously. The Nairobi Declaration contains the blueprint for the continued partnership between Africa and Japan and will guide the delivery of the agreements reached during the talks. It is also designed to contribute to the improvement of infrastructure, clean energy

generation and distribution, modernization of agriculture and health. The deal is also expected to usher in greater economic integration of Africa and will also boost empowerment of women and youth.

Ugandan President Yoweri Museveni and host President Uhuru Kenyatta also had the chance to meet at Safari Park Hotel in Nairobi following the Summit. The two leaders discussed matters of mutual interest between Uganda and Kenya.



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### Our Business Sector



## WorleyParsons Powers Ahead at Kenyan Wind Farm

WorleyParsons RSA is powering ahead on the Lake Turkana Wind Power Project in Marsabit County in northern Kenya, with an average of one wind turbine erected per day. The company is now more than half-way through the 32-month project.

When the Turkana Wind Power Project is complete it will be the largest wind farm of its kind in sub-Saharan Africa. Completion is scheduled for mid-2017.

The project is one of Kenya's top three capex projects, ultimately aiming to supply 310 MW of reliable, low-cost wind turbine generator capacity to the Kenyan national power grid. Tim Gaskell, Power Business Unit Manager for WorleyParsons RSA, says that the Lake Turkana Wind Power Project spans an area of 160 sq km and the scope includes 365 wind turbines of 850 kW each, an electric grid collection system and a high voltage substation, upgrades to 210 km of existing road, an internal site road network and a 160-man self-contained permanent village. The company's project management services include overseeing the total schedule, cost and quality of work as well as supervising and coordinating the five main contractors on the project. Although each contractor is taking responsibility for its own logistics, WorleyParsons is overseeing the process in terms of facility inspections, quality checks and testing, and delivery schedules.

Gaskell says that major delivery milestones achieved to date include the upgrading of the 210 km access road, with the road maintenance regime fully implemented and running effectively, while the internal road infrastructure providing access to the wind turbines is



approximately 90% complete. Upfront works on the housing village have also reached completion with the village providing bank, shops, medical and recreational facilities, and accommodation.

Logistical complications were anticipated as being one of the biggest challenges to the project owing to the high volume of components requiring transportation from the Port of Mombasa to the project site, approximately 1,200 km away.

"We are pleased to report that no major logistical challenges have arisen regarding transportation, so delivery of the turbines is running on schedule. Construction of the high voltage substation is also well underway and proceeding according to schedule," says Gaskell.

"Manufacturing is on schedule across all activities relating to the production of the turbines and

ocean freight is also within schedule with 153 turbine sets having arrived in Mombasa by the end of June," says Gaskell. "A total of 92 turbines have been completely installed as at 12 July 2016 and the third large crane has arrived on site and is currently in operation," he adds.

There are a total of four cranes being used for the various stages of the wind turbine erection, with lifting capacities of 90, 200, 250 and 350 tonnes. The company says targets to reach a Ready for Energization (RFE) status were recently reconfirmed with contractors to ensure 120 turbines and supporting systems are available Q4 2016.

The Kenyan government has undertaken to finance and construct a 428-km transmission line to the wind farm that will link into the national grid at Nairobi. The project is part of the Kenyan government's drive to generate 5,000 MW of power for the country by 2017.

## Cennergi Sees Tsitsikamma Reach Commercial Ops

Cennergi, the 50/50 JV between Exxaro Resources and Tata Power, achieved commercial operations at its Tsitsikamma Community Wind Farm (TCWF) Project in South Africa on August 17. The 95-MW project came about when Cennergi was selected as the preferred bidder for two wind projects under South Africa's second REIPPP.

This is the second of Cennergi's wind farm projects to achieve commercial operations in less than 30 days. Near the end of July the company also brought the 134.4-MW Amakhala Emoyeni wind farm online.

"The commissioning of the Tsitsikamma wind farm fulfils Exxaro's vision of extending its position in the energy value chain beyond coal. In addition, it is a tangible commitment to our environmental stewardship to reduce the impacts of carbon emissions in the medium-to-long term, while addressing the country's short-term electricity needs," said Exxaro CEO Mxolisi Mgojo.

Cennergi CEO Thomas Garner said that the commissioning was a culmination of many years of hard work and dedication from the Cennergi team in partnership with its stakeholders. He also paid tribute to the late Mike Mcebisi Msizi and Tsitsikamma Mfengu for bringing the opportunity

to Exxaro in 2009. "It is a privilege to have community partners that will assist Cennergi and its shareholders to write a new narrative for development in South Africa. We will assist and support the community to use this project to further determine its ideal future."

Garner further stated: "It marks the company's start in growing its vision to be a leader in cleaner energy in Africa, thereby creating value for its stakeholders."

**New Capital Power Plant 30% Complete**  
From Egypt, construction on New Capital's power plant is now 30% complete. The power plant, estimated to cost \$2 billion, is one of several

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planned plants that will boost Egypt's beleaguered power generation capacity.

Siemens has supplied the project with the first round of turbines, with a capacity of 400 MW, and a 4,800-MW electricity generator, *Al Mal News* reported.

## Solar Lighting Northern Mali Town

Solar is lighting up northern Mali thanks to a project recently introduced in the region. An estimated 1,500 households in Kidal now have power due to a \$50,000 project funded by the U.N. Multidimensional Integrated Stabilization Mission in Mali (MINUSMA).

A local NGO, AFORD or Association for Training, Research and Development, was selected to implement the six-month long lighting project. They distributed solar kits to populations in need to allow people to light their homes. More of the population of Mali will benefit from solar power as the government is building two large-scale solar power plants to feed into the national grid.

## Liberia Launches Program to Power Country

Liberia's Ministry of Lands, Mines and Energy launched a development program aimed at helping Liberia Electricity Corporation (LEC) deliver power to a widespread area. The program, Growing the National Grid Program (GTG), has been able to generate \$550 million to date.

The funds will allow for Liberia to bring power to 164,000 homes during the first phase of the three-phase project.

In addition, this investment will contribute towards 100 MW of renewable-generated power that will be fed directly back into the national grid.

## Nigerian Banks Turn to RE

As a way to cut costs at its branches across Nigeria, Deposit Money Banks (DMB) are turning to renewable energy technologies to power the branches. Some branches have entered the pilot stage, using solar panels to power their operations.

In addition to solar panels to power the branches, the banks have begun using the renewable technology to run their ATMs. According to leadership, Sterling Bank recently commenced the pilot scheme, while Fidelity Bank has adopted the use of UPS' and inverters to power its ATMs and major operations.

## Winch Installs First RPU in Mauritanian Village

The Mauritanian village of Nimjat saw the installation of a Remote Power Unit (RPU) by Winch Energy. The company is an energy developer focused on off grid and island grid projects in Africa using its proprietary technology, the RPU.



The RPU is a containerized hybrid solar PV solution equipped with battery storage, designed for power delivery in off-grid locations on a 24-hour, seven days per week basis.

The first RPU in Nimjat produces enough electricity to power 20 houses as well as the school and LED street lighting in the village. It also powers the mosque and dispensary. In addition, the solar power produced will replace some of the coal and kerosene used for lighting and cooking with cheaper and cleaner energy.

The company, in its blog, said it learned a lot of lessons from the Nimjat. "We learned a huge amount being here and installing the RPU. This will help us do it quicker and better next time. We want every member of the Winch team to participate in at least one installation over the next 12 months. You cannot truly understand what Winch does until you see the socio economic impact of the RPU in a village which today has nothing. It not only brings electricity, water and communications but hope and belief in the future."

"The future is looking very bright: our innovative and profitable technology will forever change the lives of the people most in need. It is very clear that bringing access to electricity, water and communications for remote African communities equates to better and more prosperous lives. This is a mission, not a job and I feel very privileged to be on this journey," company CEO Nicholas Wrigley was quoted on the company website.

The company also entered into a MoU with the Mauritanian government's Ministry of Petroleum, Energy and Mines to provide up to 100 off-grid villages in Mauritania with electricity, water and Wi-Fi connectivity, through its RPUs, mini grids, and smart meters.

## Touba Raises Funds for Solar Home Systems in Senegal

Touba Solar Rama out of Senegal raised €32,000 through the crowdfunding platform TRINE. Touba produces different types of solar home systems to meet the energy needs of rural, off-grid homes and communities.

The funds the company raised on the crowdfunding platform will allow for Touba to purchase and distribute 185 systems in the region of Kédougou, southeast Senegal, providing over 800 people with solar-powered lighting and phone charging.

"The social and economic impacts of this project have proven to be so high that we now aim to deploy over 500 systems throughout the country by end of its first year," Touba said.

## maxx-solar Academy Expands into KZN

maxx-solar is expanding its training program in South Africa. The company already hosts training in Johannesburg and Cape Town and now it is expanding into KwaZulu-Natal (KZN). The academy has a new partner in Andre Kauerauf from Real Solutions who is making it possible to offer training in the eastern part of South Africa.

The first course will be a Sunrise Intermediate course, maxx-solar's 2-day beginners course. At the venue, Kauerauf has a Tesla Powerwall installed being one of the cutting edge technologies implemented for showcase. His Powerwall system is the first in the KZN midlands and available for participants to have a close look at this technology.

## Ethiopia Looks to Lead RE in Africa

Ethiopia's Environment and Climate Change Minister, Dr. Shiferaw Teklemariam, said at the opening of the International Conference and Exhibition on Renewable Energy that his country looks to lead the continent in planning and constructing large renewable energy projects.

The Minister said by the end of 2020, Ethiopia planned to generate about 17,000 MW of energy from renewable energy sources.

Dr. Shiferaw also said that there has been a need to collaborate with countries facing similar challenges in environmental issues and in meeting energy demands. Public and private joint vision to power Africa must be the basis of all development cooperation, he stressed. According to Dr. Shiferaw, Africa 2063 Agenda and SDG 2030 can be realized by powering Africa with renewable energy sources.

### Aggreko Wins Benin Power Bid

Aggreko won a bid to supply 100 MW of ADDGAS-generated power to Benin. The one year contract will support the country's national grid with energy generated from ADDGAS, an add-on technology, which substitutes a significant portion of diesel fuel with natural gas.

Aggreko's award of the contract was the result of its response to the public tender process, Aggreko's bid was the only one to include an ADDGAS option. The company said in a release that by maximizing available fuel types, significant savings over the duration of the contract will be made as a result of the flexible ADDGAS solution.

Aggreko is also installing specialist high voltage equipment as part of its turn-key offering.

### Engie to Construct Solar Plant in Senegal

Engie is constructing a solar power plant in the semi-desert region of Santhiou-Mekhe, Senegal. The plant, which will use PV technology and have a capacity of 30 MW, will be implemented by Engie's solar branch Solairedirect.

The project will consist of 92,000 PV modules and be manufactured and installed by Optimum Tracker. The construction of the facility, expected to be the largest in the country, will start in Q3. The energy produced will be sold to the National Electricity Company of Senegal (SENELEC).

The establishment of this center is the result of a public private partnership between the sovereign Strategic Investment Fund (FONSIS) and PROPARCO, a subsidiary of the French Development Agency specialized in private sector financing.

### Niger Awarded AfDB Grant

Niger was awarded a \$994,270 grant from the African Development Bank-hosted Sustainable Energy Fund for Africa (SEFA) to promote green mini-grids (GMGs). The project is aimed at supporting the Niger government's efforts to provide at least 15% rural access to energy through off-grid and mini-grid solutions by 2020. The program is expected to contribute to at least \$10 million in funding raised for renewable energy projects by 2018.

"Niger has high and reliable solar irradiation intensity," stated Kurt Lonsway, AfDB's Manager for Environment and Climate Change, "and a significant opportunity for GMGs to play a major role in increasing electricity access, which is one of the lowest in the region," he added.

### Stortemelk Hydropower Plant Starts Commercial Operations

Renewable Energy Holdings Ltd. out of South Africa saw commercial operations of its 4.5-MW Stortemelk hydropower plant commence. The

\$14.3-million project, located on the Ash River, uses the outflow from the Lesotho Highlands Water Project.

Stortemelk's civil works were performed by Eigenbau Pty Ltd., with Aurecon South Africa Pty Ltd. serving as contractor, and Andritz Hydro and Indar Electrical SL providing equipment. Work on the project took 18 months to complete.

The small hydro plant was recognized by South Africa's REIPPP and will be operated by REH Operations & Maintenance Pty Ltd.

### Egypt to See First Solar Power Plant Start Up

Egypt will see the start of production at its first solar power plant before the end of September according to reports. The power produced from the solar farm will be sold to an Egyptian beverage and yogurt company, Juhayna.

The LE14 million solar farm was financed through the Social Fund for Development and internal investments from the company itself.

As the first solar energy producing power plant in Egypt, Karm Solar's facility will save 600,000 liters of diesel each year, and reduce the country's carbon footprint by 1,620t annually, reports from local media state.

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## FROM PIM TO RFQ

IT'S EXCITING THAT THE COMPANIES WHO ATTENDED LAST YEAR'S MEETING HAVE REMAINED IN CLOSE CONTACT WITH THE GOVERNMENT, WHO CONTINUE TO ABSORB KNOWLEDGE TO GUARANTEE THIS PROGRAMME IS DELIVERED AS EFFECTIVELY AS THE REIPPPP.

### CONFIRMED SPEAKERS

**Thabane Zulu**, Director General, Department of Energy, South Africa  
**Karen Breytenbach**, Head of IPP Office, Department of Energy, South Africa  
**Lena Mangondo**, Head of Legal, IPP Office, Department of Energy, South Africa

**Nomfundo Maseti**, Regulatory Member, National Regulator of South Africa  
**Andrew Herscovitz**, Co-ordinator, Power Africa  
**Peter Ballinger**, Managing Director, Southern Africa, Overseas Private Investment Corporation  
**Mukund Dhar**, Partner, White and Case  
**Gonzalo Ramirez**, Director, South America, Excelerate Energy  
**Tracy Lothian**, Vice President, LNG Market Development

**Ramzi Mroueh**, Managing Director EMEA, Cheniere  
**Sean Friend**, Investment Director, Infrastructural, Developmental and Environmental Assets Managed Fund, Old Mutual Alternative Investments  
**Chris Utting**, Executive Partner, White and Case

BUILDING ON LAST YEAR'S SUCCESSFUL SOUTH AFRICA: GAS OPTIONS MEETING, ENERGYNET WILL CONTINUE TO FACILITATE REGIONAL DISCUSSIONS BETWEEN PUBLIC AND PRIVATE SECTOR, REQUIRED TO IMPLEMENT AN EFFECTIVE GAS TO POWER PROGRAMME.

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## African Rig Count

Country	April 2016	May 2016	June 2016	July 2016
ALGERIA	55	55	59	55
ANGOLA	9	9	9	5
BENIN	0	0	0	0
CAMEROON	1	1	0	0
CHAD	0	0	0	0
CONGO	2	1	2	1
CONGO, DRC	0	0	0	0
COTE D'IVOIRE	1	2	2	1
EGYPT	30	28	26	27
EQUATORIAL GUINEA	0	0	0	0
ETHIOPIA	0	0	0	0
GABON	1	1	1	0
GHANA	1	1	1	1
KENYA	11	11	11	10
LIBERIA	0	0	0	0
LIBYA	1	1	1	1
MAURITANIA	0	0	0	0
MOROCCO	0	1	1	1
MOZAMBIQUE	0	0	1	1
NAMIBIA	0	0	0	0
NIGERIA	6	6	5	5
SENEGAL	1	1	0	0
SIERRA LEONE	0	0	0	0
SOUTH AFRICA	1	1	0	0
SUDAN*	N/A*	0	0	0
TANZANIA	0	0	0	0
TOGO	0	0	0	0
TUNISIA	0	0	0	1
UGANDA	0	0	0	0

Source: Baker Hughes International

\*Data not available

## Africa Production of Crude Oil

(including Lease Condensate, Thousand Barrels/Day)

Country	2016		
	April	May	June
Africa	6675.5	6411.5	6562.5
Algeria	1074	1080	1085
Angola	1788	1773	1773
Cameroon	75	74	75
Chad	99	98	98
Congo (Brazzaville)	235	237	234
Congo (Kinshasa)	20	20	20
Cote d'Ivoire (Ivory Coast)	32	31	32
Egypt	640	641	641
Equatorial Guinea	235	235	236
Gabon	220	220	214
Ghana	33	41	62
Libya	345	296	332
Mauritania	6	6	6
Morocco	0.5	0.5	0.5
Niger	20	20	20
Nigeria	1637	1424	1523
South Africa	3	3	3
Sudan and South Sudan	155	157	153
Tunisia	58	55	55

Sources: Various sources including EIA and OPEC

## Production of Natural Gas Plant Liquids

(Thousand Barrels/Day)

Country	2016		
	April	May	June
Algeria	309	308	310
Angola	55	55	55
Congo (Brazzaville)	17	17	17
Egypt	191	193	195
Equatorial Guinea	20	20	19
Libya	28	28	29
South Africa	5	5	5
Tunisia	4	4	4
Total Africa	629	630	634

Source: Various Sources

\*Data not available

## World Rig Count

Country	July 2016			Variance From Last Month	June 2016			July 2015		
	Land	Offshore	Total		Land	Offshore	Total	Land	Offshore	Total
LATIN AMERICA	153	33	186	8	147	31	178	259	54	313
EUROPE	52	42	94	3	52	39	91	60	48	108
AFRICA	70	12	82	-5	68	19	87	69	25	94
MIDDLE EAST*	339	51	390	1	341	48	389	342	49	391
ASIA PACIFIC	98	88	186	4	96	86	182	124	88	212
UNITED STATES	429	20	449	32	396	21	417	835	31	866
CANADA	92	2	94	31	63	0	63	179	4	183
WORLDWIDE Total	1,233	248	1,481	74	1,163	244	1,407	1,868	299	2,167

Source: Baker Hughes International

\*The Middle East rig count excludes rigs in Syria for January 2014 and December 2013.

## OPEC Oil Production (Thousand Barrels/Day\*)

Country	2016		
	April	May	June
Algeria	1074	1080	1085
Angola	1788	1773	1773
Ecuador	547	549	550
Gabon	215	215	214
Indonesia	731	740	740
Iran, I.R.	3451	3562	3644
Iraq	4354	4281	4217
Kuwait	2640	2740	2800
Libya	345	296	332
Nigeria	1637	1424	1523
Qatar	669	659	662
Saudi Arabia	10125	10241	10308
UAE	2780	2826	2914
Venezuela	2298	2188	2095
<b>TOTAL OPEC</b>	<b>32439</b>	<b>32361</b>	<b>32858</b>
OPEC excluding Iraq	28085	28080	28641

Source: OPEC

\*Based on secondary sources

## World Oil Production (million barrels per day)

Country	2016		
	Q2 2016	May	June
Americas <sup>1</sup>	18.9	18.55	18.78
Canada	3.79	3.53	3.74
Chile	0.01	0.01	0.01
Mexico	2.49	2.48	2.51
United States	12.62	12.66	12.52
Asia Oceania <sup>2</sup>	0.41	0.43	0.42
Australia	0.33	0.32	0.34
Others	0.08	0.08	0.08
Europe <sup>3</sup>	3.44	3.43	3.31
Norway	1.94	1.96	1.82
UK	1.05	1.01	1.04
Others	0.45	0.46	0.45
<b>Total OECD</b>	<b>22.76</b>	<b>22.41</b>	<b>22.51</b>
<b>Total Non OECD</b>	<b>28.63</b>	<b>28.79</b>	<b>28.86</b>

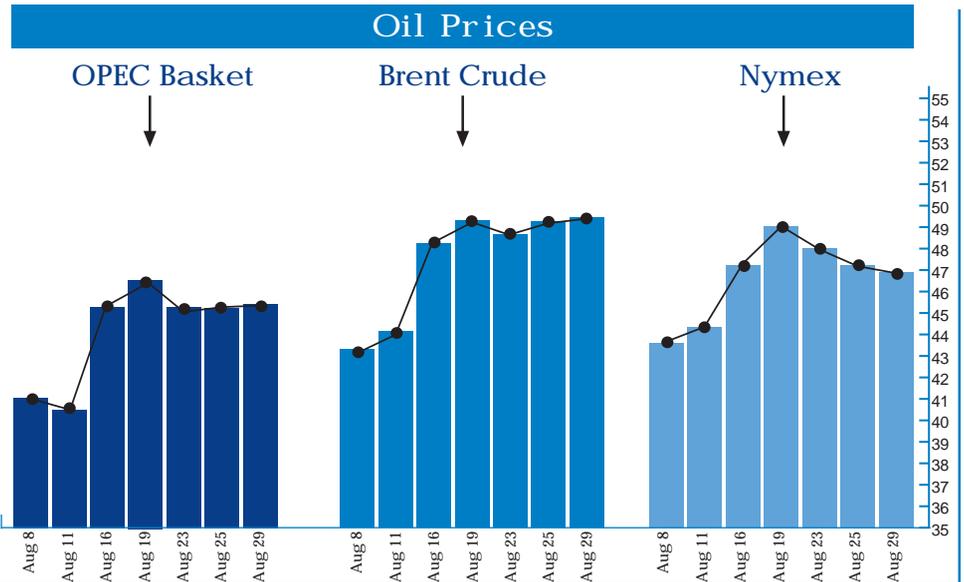
Source: IEA Oil Market Report

<sup>1</sup>As of the August 2012 OMR, includes Chile

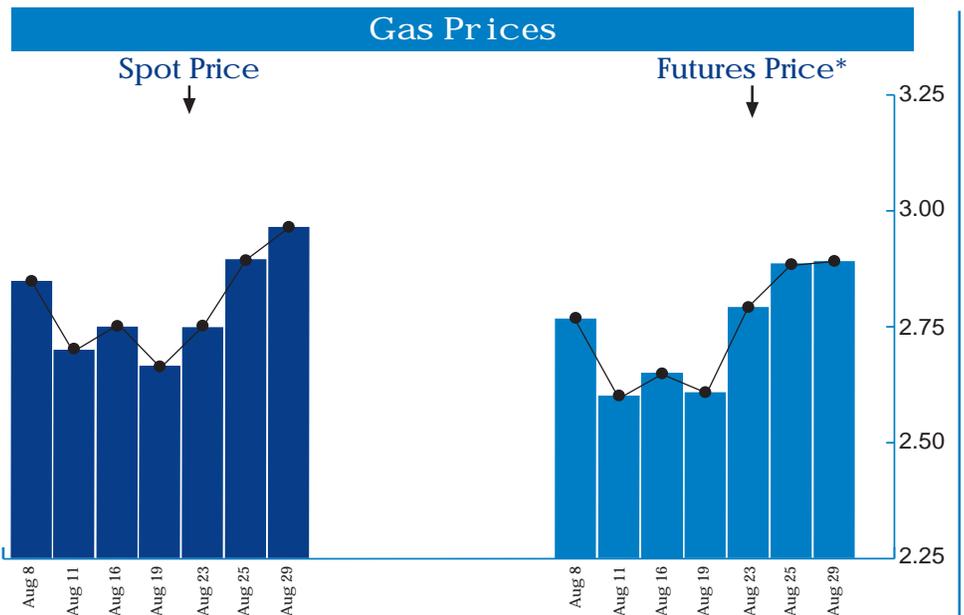
<sup>2</sup>As of the August 2012 OMR, includes Estonia and Slovenia.

<sup>3</sup>As of the August 2012 OMR, includes Israel.

	Aug 8	\$
OPEC Basket		41.10
Brent Crude		43.24
Nymex		43.76
Aug 11		
OPEC Basket		40.62
Brent Crude		44.23
Nymex		44.23
Aug 16		
OPEC Basket		45.03
Brent Crude		48.27
Nymex		47.22
Aug 19		
OPEC Basket		46.82
Brent Crude		49.39
Nymex		49.11
Aug 23		
OPEC Basket		45.34
Brent Crude		48.70
Nymex		48.10
Aug 25		
OPEC Basket		45.28
Brent Crude		49.25
Nymex		47.33
Aug 29		
OPEC Basket		45.44
Brent Crude		49.66
Nymex		46.98



	Aug 8	
Henry Hub		2.85
New York		2.77
Aug 11		
Henry Hub		2.70
New York		2.60
Aug 16		
Henry Hub		2.75
New York		2.65
Aug 19		
Henry Hub		2.67
New York		2.61
Aug 23		
Henry Hub		2.75
New York		2.79
Aug 25		
Henry Hub		2.89
New York		2.88
Aug 29		
Henry Hub		2.97
New York		2.89



\* Contract 2

Dollars per BTU

Data compiled by Petroleum Africa from various sources including OPEC, EIA and others.

# Conferences

## October 2016

3-5	The South Africa Gas Options	Cape Town, South Africa	www.energynet.co.uk
11-13	4 <sup>th</sup> Mauritanian Mining and Oil and Gas Conference & Exhibition (MAURITANIDES 2016)	Nouakchott, Mauritania	www.mauritanides-mr.com
12-13	Gas to Liquids	London, UK	www.gas-to-liquids.co.uk
17-18	International Green Shipping Summit	Rotterdam, The Netherlands	www.gssummit.org
24	Infra-Gas Projects Mozambique 2016	Maputo, Mozambique	www.africaninfex.com
24-26	Pumps Reliability & Efficiency	Lagos, Nigeria	www.salvoglobal.com
24-26	7 <sup>th</sup> Argus Middle East Gulf & Indian Ocean Oil Products Conference (AMGIO 2016)	Dubai, UAE	www.argusmedia.com
26-27	BBTC Middle East & Africa 2016 – Bottom of the Barrel Technology Conference	Manama, Bahrain	www.bbtc-mena.biz
30-31	GSF 2016 – Gulf Safety Forum	Doha, Qatar	www.gulfsafetyforum.com
31- Nov 4	23 <sup>rd</sup> Africa Oil Week 2016	Cape Town, South Africa	www.africa-oilweek.com

## November 2016

14-16	11 <sup>th</sup> LPGTrade Summit 2016	Dubai, UAE	www.cmtevents.com
15-17	The 4 <sup>th</sup> East Africa Oil and Gas Summit & Exhibition (EAOGS)	Nairobi, Kenya	www.eaogs.com
21-22	Project Financing in Oil & Gas	London, UK	www.smi-online.co.uk
21-23	Getenergy VTEC Africa 2016	Dar es Salaam, Tanzania	www.africa.getenergyevent.com
22-24	The 6 <sup>th</sup> Practical Nigerian Content Forum (PNC)	Abuja, Nigeria	www.cwcpnc.com
22-24	The 1 <sup>st</sup> International Jordanian Forum For Occupational Safety and Health 2016	Amman, Jordan	www.osh-forum.com
23-24	1 <sup>st</sup> Annual MSGBC Basin Summit and Exhibition	Dakar, Senegal	www.msgbc.theenergyexchange.co.uk
28-29	International Gas Summit	Nice, France	www.gassummit.org
30-Dec 2	Mozambique Gas Summit & Exhibition	Maputo, Mozambique	www.mozambique-gas-summit.com

## December 2016

5-7	Getenergy VTEC MENA 2016	Abu Dhabi, UAE	www.mena.getenergyevent.com
6-7	OpEx MENA 2016 – Operational Excellence in Oil, Gas & Petrochemicals	Abu Dhabi, UAE	www.opex.biz
8	Green Forum – Green Solutions for the Downstream Industry	Abu Dhabi, UAE	www.greenforum.ae
12-14	Oil & Gas Non-Metallics 2016	London, UK	www.amiplastics.com

## January 2017

26-27	North Africa Summit	Milan, Italy	www.nas.theenergyexchange.co.uk
26-27	North Africa Downstream Summit	Milan, Italy	www.nads.wraconferences.com

## February 2017

13-14	Floating LNG 2017	London, UK	www.floating-lng.co.uk
14-16	EGYPS 2017	Cairo, Egypt	www.egyptpetroleumshow.com
20-21	IGTC 2017 – 8 <sup>th</sup> International Gas Technology Conference	Dubai, UAE	www.europetro.com
21-23	ME-TECH 2017 – 7 <sup>th</sup> Middle East Technology Forum for Refining & Petrochemicals	Dubai, UAE	www.me-tech.biz
23-24	LNG Summit United States	Texas, US	lng-usa.com

## March 2017

6-8	PVPC Expo	Abu Dhabi, UAE	www.pvpexpo.ae
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## June 2017

6-8	Offshore West Africa	Lagos, Nigeria	www.offshorewestafrica.com
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O	T	X	M	E	T	E	R	I	N	G	N	P	C	C	E	M	S	Q
D	D	C	U	O	Z	Q	T	J	A	H	F	N	V	V	N	D	B	F
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E	W	I	S	S	B	L	L	M	O	W	B	F	X	K	V	X	A	K
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Y	U	B	I	T	S	R	I	T	I	O	J	R	X	T	Z	B	L	M
D	U	Q	R	M	I	J	T	W	I	I	N	I	H	R	Y	O	F	W
R	T	U	C	R	B	C	O	E	T	N	A	G	N	P	W	R	Q	E
I	K	Z	J	O	R	C	Y	B	T	E	E	D	O	J	M	F	Z	B
L	I	R	K	F	A	S	R	F	A	P	L	G	N	R	P	J	D	A
L	W	U	F	M	A	S	D	U	J	Y	O	E	R	A	T	K	N	Z
I	R	M	Q	A	V	A	X	N	K	P	B	T	I	A	G	U	Y	E
N	A	J	A	R	E	S	Z	E	Y	A	F	I	K	R	B	U	C	D
G	Q	T	Y	N	I	S	Z	P	N	Z	N	K	L	S	A	E	M	Q
H	Z	M	A	X	V	Q	O	M	Z	I	Y	C	V	G	E	S	N	T
L	Q	I	W	O	I	Q	Q	E	C	Q	Q	B	S	Q	D	D	V	R

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## BONUS

*(Find the answers in the magazine and then find them within the Puzzle)*

Ironically, the \_\_\_\_\_ is partially due to Bongo's desire to be seen as a legitimate leader. **(Oil Security)**

What matters is one's \_\_\_\_\_ satisfaction and ability to impact positively on the country's socio-economic aspirations. **(Women in Energy)**

The \_\_\_\_\_ Oil-in-Water Analyzer will also be particularly suited to challenging fields that host separation from different tie-backs with various oil types in the same produced water. **(New Products)**

Answers listed on page 60



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## CA Oil & Gas

**Position:** HR Manager  
**Location:** Pemba, Mozambique  
**Position Description:** CA Oil and Gas are currently seeking an HR Manager to be based in Pemba, Mozambique.  
**Experience & Education:** Relevant qualification. Minimum 5 – 8 years' experience

**Contact:** Nico Viljoen, CA Oil & Gas  
**Tel:** +27 21 659 9200  
**Email:** nico@camining.com

## CA Oil & Gas

**Position:** Electrical Technician – Luanda, Angola  
**Location:** Tete, Mozambique  
**Position Description:** CA Oil and Gas are currently seeking experienced Electrical Technicians to be based in Luanda, Angola  
**Experience & Education:** Minimum 6 years' varied experience within Electrical sector in Angola.

**Contact:** Zade-Leo Stafford, CA Oil & Gas  
**Tel:** +27 21 659 9200  
**Email:** zade@caglobalint.com

## CA Oil & Gas

**Position:** Project Director  
**Location:** Cape Town, South Africa  
**Position Description:** CA Oil & Gas are currently seeking an experienced Project Director to be based in Cape Town, South Africa.  
**Experience & Education:** 10 years' experience needed with good knowledge in the upstream & downstream industry.

**Contact:** Zade-Leo Stafford, CA Oil & Gas  
**Tel:** +27 21 659 9200  
**Email:** zade@caglobalint.com

## CA Oil & Gas

**Position:** General Manager – Oil & Gas  
**Location:** Various locations in the SSA Region  
**Position Description:** CA Oil and Gas are currently seeking General Manager with experience in the Oilfield Services industry.  
**Experience & Education:** Minimum 15 years' varied experience within the Oilfield Services sector.

**Contact:** Zade-Leo Stafford, CA Oil & Gas

**Tel:** +27 21 659 9200

**Email:** zade@caglobalint.com

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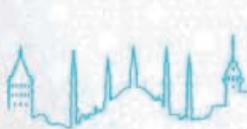
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