

Oil Review

Oil · Gas · Petrochemicals

Africa

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Nigeria's refinery ambitions

New oil-gas plays in Mauritanian-Senegalese waters

Off-grid connectivity is opening the door to optimise energy efficiency

Sustainable pumps, pipeline coating, seismic technology, fabrication, oil and gas digitalisation



Grace Orife, CEO of Adelaar Energy, on the rise of women in African oil and gas (p34)

NEW TD-15M



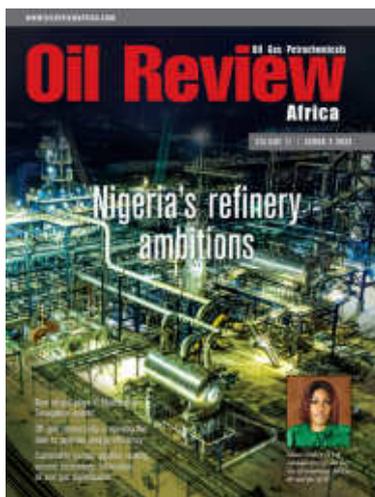
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A detailed analysis of southern Africa can be found on page 23. Image Credit: Dangote

EDITOR'S NOTE

IN THIS ISSUE, the focus is on Dangote refinery project which is nearing completion. Turn to page 23 to see the scale of the venture that brought together a small army of contractors from around the globe to get the job done.

Additionally, the Mauritanian-Senegalese waters (p12), Africa's most westerly hydrocarbons province, is gathering pace, with growing interest from BP, ExxonMobil, Shell and TotalEnergies. The exciting new exploration projects are certainly attracting opportunities for bold investors and ambitious service companies.

It is timely that we feature the eastern part of the continent in this issue, with key focus on Mozambique. Currently, a lot is going on the country's Coral Sul FLNG project. Besides, Mozambique has pre-qualified 12 companies for the sixth licensing round, and it would be interesting to see the progress of the bid lifecycle. We've also got an update in this issue on the outlook for Namibia (p16). The country is moving closer to emerging as the next global exploration hotspot.

Deblina Roy
Editor

CONTENTS

NEWS

5 African hydrocarbon news
Updates from across the continent.

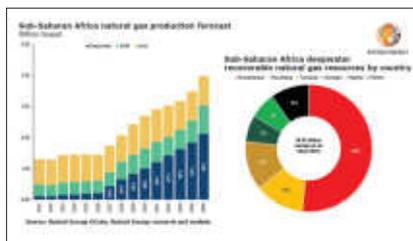
COVER STORY

23 Dangote refinery
Originally scheduled to come on stream in 2019, Nigeria's flagship Dangote refinery project is nearing completion with start up now anticipated this year. The scale of the venture brought together a small army of contractors from around the globe to get the job done.

COUNTRY FOCUS

12 Mauritania and Senegal
Potential extractable reserves.

14 Mozambique
Licensing round and major FLNG milestones.

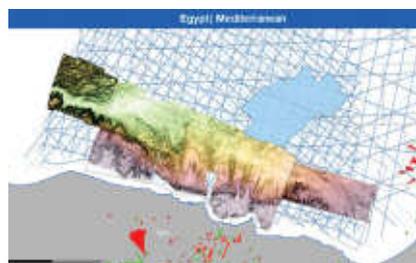


16 Namibia
Ambitious oil and gas projects

TECHNOLOGY AND OPERATIONS

18 Pumps
in reducing carbon footprints

22 Seismic technology
Best way to identify prospects



INTERVIEWS

17 Dr Raymond Ruthvin, regional medical director at International SOS, on the HSE considerations.

21 Mika Tienhaara, CEO of ROCSOLE, on how to control production shutdowns and operational delays.

34 Grace Orife, CEO of Adelaar Energy, on the role of women in Africa's energy development.

Editor: Deblina Roy

✉ deblina.roy@alaincharles.com

Editorial and Design team: Mariam Ahmad, Prashanth AP Fyna Ashwath, Miriam Brtkova, Praveen CP, Robert Daniels Shivani Dhruv, Matthew Hayhoe, Lucia Mathurin, Unique Pattnaik Tulana Nayak, Prince Kariappa, Rahul Puthenveedu and Louise Waters

Publisher: Nick Fordham

Sales Manager: Richard Rozelaar
E-mail: richard.rozelaar@alaincharles.com

Publication Manager: Vinay Nair
Tel: +44 (0) 20 7834 7676 Fax: +44 (0) 20 7973 0076
E-mail: vinay.nair@alaincharles.com

International Representatives

India Tanmay Mishra
Nigeria Bola Olowo
UAE Murshid Mustafa
USA Michael Tomashelsky

Head Office:

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

Middle East Regional Office:

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

Production: Srinidhi Chikkars, Dinesh Dhayalan and Eugenia Nelly Mendes
E-mail: production@alaincharles.com

Subscriptions: circulation@alaincharles.com

Chairman: Derek Fordham

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MAY

19-21 9th Power & Energy Africa
Nairobi
www.expogr.com/kenyaenergy

JUNE

2-3 MMEC
Mozambique
<https://mozambiqueoilmining.com/>

JULY

4-7 NOG 2022
Abuja
www.nogevent.com

AUGUST

3-4 Tanzania Energy Congress
Dar Es Salaam
<https://www.tanzaniaenergycongress.com/>

SEPTEMBER

1-2 MSGBC Oil, Gas & Power
Senegal
<https://energycapitalpower.com/event/msgbc-oil-gas-power-2022/>

13-14 South Sudan Oil & Power
Juba
<https://energycapitalpower.com/event/ssop-2022/>

14-15 Mozambique Gas & Energy Summit
Mozambique
<https://www.mozambiqueenergysummit.com/>

OCTOBER

3-7 Africa Oil Week
Cape Town
<https://africa-oilweek.com/Home>

18-21 African Energy Week
Cape Town
<https://aecweek.com/>

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

The gateway to East African oil and gas industry

THE 09TH OIL & Gas Africa – Int'l Trade Exhibition, to be held from 19-21 May 2022, is a hub for key players in the oil and gas community, attracting leading oil, gas and petroleum companies from around the world.

This regional trade event serves the resource-rich east African region and city of Nairobi; Kenya's major centre of oil and gas activity, for many of the leading operators in the country.

Kenya has attracted oil and gas companies not only because of its ports and strategic location but also because the government is keen not to be left out of the exploration. Oil discoveries in Uganda and Kenya and gas deposits found off Tanzania and Mozambique have turned east Africa into a hot spot for hydrocarbon exploration.

Trade visitors from all over East and Central Africa are being invited directly as well as in collaboration with several regional trade bodies in Kenya, Tanzania, Ethiopia, Uganda, Somalia, Mozambique and Congo. Though Kenya by itself is one of the biggest markets in Africa, major emphasis is being laid upon attracting traders and importers



The event will showcase the industry's latest achievements and technologies.

from neighboring countries.

Oil and Gas Africa will offer participants the opportunity to showcase the industry's latest achievements and technologies while networking with key figures from the region's oil and gas sector. The exhibition brings the industry together in a forum that is conducive to business.

Some of the exhibitors include Murban Engineering Limited, TMK, Ram Ithalat Ihracat Insaat Nakliyat Sanayi ve Ticaret Ltd, Vansh Industries, Naffco, Portwest, Flowdy, RM Istanbul, Senkox Technologies, Petro Nikan Alborz, Motion Industrials Ltd, Ubmc Group (Sipes), Bluelight hub services and solutions and others.

Helios and Sojitz collaborate in West Africa

HELIOS INVESTMENT PARTNERS, the Africa-focused private investment firm, acting on behalf of funds it advises, and Sojitz Corporation, one of the leading conglomerate investment and trading houses listed on the Tokyo Stock Exchange, has completed the sale of a 25% interest in the holding company of Axxela.

This transaction marks Sojitz's first significant equity investment in Africa, indicating its growth ambitions on the continent and serving as a blueprint for future collaboration in Africa between Helios and Sojitz across a range of sectors.

Under Sojitz's "Medium-Term Management Plan 2023", the company aims to adopt a market-oriented initiative in growth industries and in accordance with the plan, has developed a downstream gas business in Vietnam. This know-how will enhance the Axxela Group's operation and growth and ultimately aim to provide multiple energy solutions meeting individual customer's requirements while contributing to CO2 reduction.

Ogbemi Ofuya, partner at Helios Investment Partners, commented, "This transaction demonstrates the value of our strategy to build market-leading, strategically important businesses which become highly sought-after by global investors seeking to enter Africa or grow their presence on the continent."

Bolaji Osunsanya, CEO of Axxela Limited, commented, "This represents another first for us as an organisation, and a huge testament of continued investor confidence in our business."

Wood wins contract for first oil development offshore Senegal

WOOD HAS BEEN awarded a contract by Woodside Energy for the Sangomar FPSO development, located 100km south of Dakar, Senegal.

The floating production storage and offloading (FPSO) facility is specifically designed for the processing of hydrocarbons and the storage of oil before being transported to markets around the world.

On completion in 2023, the FPSO will have a production capacity of approximately 100,000 barrels per day of crude oil, which will provide revenue to help deliver sustainable long-term economic and social benefits for Senegal.

A multidisciplinary Wood team will implement a combined production management system (PMS) and virtual metering



Image Credit: Adobe Stock

system (VMS) at the Sangomar FPSO control room and Woodside's onshore offices in Senegal and Perth, leveraging Wood's digital capabilities and Virtuoso platform.

The Virtuoso PMS and VMS will provide real-time monitoring of the production system

together with decision support for complex operations and advanced surveillance for hydrate and wax management. The PMS will ensure continuity of production and minimised flaring which reduces the greenhouse gas emissions and methane intensity of Sangomar.

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Afentra selected as preferred bidder to purchase interests in Angola's Block 3/05 and Block 23

SONANGOL EP HAS announced that Afentra has been selected as preferred bidder to purchase interests in Block 3/05 and Block 23.

This follows the announcements on 8 October 2021 and 3 February 2022 that

Afentra had submitted a non-binding expression of interest for the two blocks which resulted in the subsequent suspension of Afentra shares.

During the first quarter of 2022, Afentra has continued to progress the sale and purchase

agreement (SPA) negotiations with Sonangol and are pleased to now be selected as preferred bidder for both blocks. The next steps will involve finalising the SPA and completing the final due diligence required on the Acquisition. There is, however, no guarantee at this stage that an agreement between the two companies will be reached.

If Afentra ultimately proceeds with the Acquisition, it would be classified as a reverse takeover transaction in accordance with Rule 14 of the AIM Rules for Companies. Trading in Afentra shares will remain suspended until either the publication of an AIM admission document, or until confirmation is given that Afentra's participation in the bid process has ceased.



Image Credit: Adobe Stock

In June 2021, Sonangol initiated an asset sales process to divest some of its interests in eight blocks across its portfolio.

Eni and Sonatrach to increase gas supplies from Algeria through Transmed

IN THE PRESENCE of the Algerian President Abdelmadjid Tebboune and the Italian Prime Minister Mario Draghi, the President of Sonatrach, Toufik Hakkar, and the CEO of Eni, Claudio Descalzi have signed an agreement that will allow Eni to increase the quantities of gas imported through the TransMed / Enrico Mattei pipeline in Algiers.

This agreement will allow to exploit the pipeline's available transportation capacities to ensure greater supply flexibility, gradually providing increasing volumes of gas from 2022, up to nine bcm per year in 2023-24.

The agreement between Eni and Sonatrach, whose foundations have been laid during the previous visit of Descalzi and the Italian foreign minister Di Maio to Algiers in 28 February, was defined and signed in record time

Image Credit: Adobe Stock



The new gas volumes covered by the agreement are also the result of the close collaboration in the development of upstream gas projects.

following intense negotiations between the top management of the two companies.

The new gas volumes covered by the agreement are also the result of the close collaboration in the development of upstream gas projects, leveraging Eni's distinctive fast track model, which is bringing a significant

acceleration to the production potential of the Algerian fields.

Eni CEO Descalzi said, "It was possible in a short time and with an enormous joint effort to sign this important agreement that further consolidates the partnership between the companies and strengthens the cooperation between our countries."

Cloudbreak to participate in oil and gas exploration in Namibia

CLOUDBREAK DISCOVERY HAS entered into a Mineral Application Cooperation Agreement (MACA) with Gondwana Petroleum Namibia, Timeworn



The aim is to jointly work towards submission of an application to acquire Petroleum Exploration License 1724 in Namibia.

Investments, Pioneer Oil and Gas Consulting and a Swiss Based Asset Manager (SBAM).

The aim is to jointly work towards submission of an application to acquire Petroleum Exploration License 1724 in Namibia.

The financial guarantee will be replaced as soon as practical by a new holding company. In exchange for Cloudbreak's participation as financial partner, it will receive a 10% interest in Block 1724. Additionally, should the award of Block 1724 be offered by the Ministry of Mines and Energy, the MACA will be replaced by a definitive agreement prior to accepting the award of Block 1724.

Kyler Hardy, president and CEO of Cloudbreak, commented, "By deploying our project generation methodology and strategies into the energy sector, Cloudbreak has an opportunity to expand the scope of our exploration and development projects. Recent discoveries by several major and mid-sized global energy companies in Namibia have opened significant opportunity to participate in new exploration initiatives in the country.

Schlumberger and Sintela sign technology sharing deal

SCHLUMBERGER AND SINTELA have signed an agreement to co-develop new fibre-optic solutions for multiple industrial markets.

Schlumberger will market and deliver the solutions in the energy, carbon capture and storage (CCS) and geothermal industries, with Sintela delivering the combined solutions to other industrial markets.

The solutions is expected to integrate intellectual property (IP) from Sintela's distributed fibre-optic sensing (DFOS) portfolio with IP from Optiq Schlumberger fibre-optic solutions, enabling simpler, cost-efficient fibre-optic interrogator deployments and new digital workflow capabilities to improve Schlumberger's operational performance.

"Working together with Sintela, we will deliver a range of fibre-optic solutions that enhance measurement data handling capability at the edge, rapidly delivering actionable insights to our upstream and midstream customers in domains such as geophysics, well integrity, production monitoring and pipeline monitoring," said Aparna Raman, president, reservoir performance, Schlumberger.

"Sintela brings years of cross-industry R&D knowledge and experience with DFOS technologies — including optical interrogators — that we will leverage with our combined IP and industry domain knowledge to accelerate the pace of innovation, deploy solutions at scale, and develop more integrated and open workflows with customers, leveraging artificial intelligence (AI) and machine learning (ML)."



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Entec International signs deal with Hyde Energy Nigeria in oil and gas sector

MRO SUPPLY CHAIN specialist Entec International has won a contract with Hyde Energy Nigeria, representing the company's first foray into the oil and gas sector

Hyde is a global energy trading company with a downstream network, importing to and trading in Nigeria. As the company continues to invest in additional tank and storage facilities, as well as building its network of LPG gas distribution centers across the region, Hyde has contracted with Entec to source and ship industrial equipment to Nigeria.

Head of business development for Entec Torben Kring explained, "Entec has been operating in West Africa for major FMCG companies for many years. We have a proven



Hyde aims to provide cost-effective solution for shipment.

network of strategic transportation partners and well-established supply lines into Nigeria."

"Hyde is looking to leverage our experience and expertise both in best-price procurement and cost-effective consolidation and shipment. We are delighted

to be working alongside a resilient, dynamic, and expanding company like Hyde. We envisage a mutually beneficial long-term partnership as the company invests further in multiple assets, requiring ongoing MRO procurement and supply chain support," Kring added.

Eni signs MoU with government of Rwanda to boost circular economy

ENI AND THE Government of Rwanda have signed a MoU to identify collaborative opportunities in the areas of circular economy, agriculture, forestry, innovation and digital

information technology

Under the terms of the MoU, the two parties will evaluate the feasibility of circular economy projects focused on collecting used cooking oil and waste oils,

waste management valorisation and recycling.

The fields of interest also include agriculture, especially bio-feedstock production and the transformation into decarbonised products. This is in addition to forestry, especially forest conservation and generation of carbon credits through a wide range of initiatives, such as reducing CO2 emissions from the wood-fuel value chain and other service activities.

Other sectors of cooperation under the MoU include innovation and digital information technology targeting circular economy, agriculture, forestry, off-grid energy and other business areas, such as sustainability, health, safety, security and environment.



Other sectors of cooperation under the MoU include innovation and digital information technology targeting the circular economy.

SDX reports west Gharib spudding

SDX ENERGY, THE MENA-focused energy company, has announced the spudding of the MSD-20 infill development well on the Meseda field

This well is the third in a fully funded 13-well development drilling campaign on the Meseda and Rabul oil fields in the West Gharib concession in the Egyptian Eastern Desert. The campaign is aimed at growing production to c.3,500 - 4,000bbl/d by early 2023.

The MSD-20 infill development well on the Meseda Field (SDX: 50% working interest) spud on 5 April 2022 and is targeting the Asl Formation reservoir at approximately 3,180ft TVDSS. It is estimated that the well will take around six weeks to drill, complete and tie-in to the existing infrastructure.

MSD-20, with an expected cost to drill and tie in of US\$0.9- US\$1mn (gross), is anticipated to come on-line and produce at around 300bbl/d (gross), which would immediately contribute to Group cashflow and result in a payback period of five to six months at current oil prices. The company expects to update the market on its result in mid-May.

Mark Reid, CEO of SDX, commented, "West Gharib is a very high margin asset in our portfolio with a Netback of US\$37/bbl at US\$71/bbl Brent in FY2021. Given this, it is our intention to execute this 13-well campaign as quickly as possible to significantly boost production and cashflow from these fields. In line with this aim, a second rig has been contracted and is currently on location at the next well, MSD-24, which should be operating soon."

Invictus Energy to extend farm-in process for Zimbabwe's Cabora Bassa project

INVICTUS ENERGY HAS granted Cluff Energy Africa's (CEA) request to extend its farm-in option expiry and submit an updated binding offer.

The new agreed expiry for CEA to exercise its option has been extended from 31 March to 30 April 2022.

The extension request follows the agreement with the Republic of Zimbabwe and Sovereign Wealth Fund of Zimbabwe (SWFZ) to increase the SG 4571 licence area from 100,000 ha to 709,300 ha.

The extension to the option period coincides with the revised mobilisation date for Exalo's Rig 202 from Tanzania which is now expected to arrive at the project in mid June compared to previous estimates at the time of CEA option agreement in early May.

The additional time will allow CEA to assess the extended SG 4571 area and finalise additional funding requirements associated with the drilling campaign and past costs.

Following completion and review of the Cabora Bassa 2021 Seismic Survey data and the SWFZ agreement to increase the SG 4571 licence area, Invictus continues to progress the farm-in process and is in active discussions with multiple parties.

Planning is underway to commence a two-well drilling programme in June, including the Muzarabani-1 well targeting 8.2 tcf and 247 mmbbl of conventional gas-condensate.

Sparrows Group wins offshore crane operations contract in Angola

ENGINEERING AND MAINTENANCE services specialist Sparrows Group has secured a three-year contract to provide crane operations and maintenance services offshore Luanda, Angola.

The agreement covers 10 pedestal cranes and six line and rescue craft boats across the field's four assets.

Having held the contract since 2005, Sparrows will continue to manage the operation, inspection, load testing, structural repairs, major and general maintenance of the cranes, as well as the delivery of highly skilled crane operators, technicians, and core specialists.

In addition, the organisation will be responsible for project management, troubleshooting, equipment changeouts and



Image Credit: Sparrows

This contract extension – and additional scope – will see the continuation of a long-held collaborative and trusted commercial relationship.

technical engineering support. All refurbishment and repair work scopes will be undertaken at Sparrows' facility in Luanda.

Stewart Mitchell, CEO at Sparrows, said, "We invested in a new workshop, office space and training facilities in 2020 which has allowed us to continue delivering in-country equipment

repairs and refurbishments for our customers as well as providing local skills development."

"This contract win is testament to the dedication of our Africa team who have worked diligently to overcome complex travel restrictions due to the COVID-19 pandemic."

PGS releases 3D GeoStreamer data for Ghana Tano Basin

PGS HAS ADDED a further 2,000 sq km of KPSDM processed MultiClient 3D GeoStreamer data offshore Ghana, revealing prolific Cretaceous reservoir targets in sharper detail, thus significantly

increasing 3D coverage in the basin.

This 3D GeoStreamer survey targets the Tano Basin, in an area that has seen recent high-profile exploration success, with ENI's



Image Credit: Adobe Stock

This 3D GeoStreamer survey targets the Tano Basin, in an area that has seen recent high-profile exploration success.

Baliene-1X discovery in August 2021, and Springfield's Afina-1X discovery in November 2019.

The upper cretaceous play is the focus, with deep marine turbidite channel and fan complexes providing excellent reservoir potential in the Cenomanian, Turonian and Campanian intervals. Deeper syn-rift plays are also well imaged with multiple Albian-aged leads identified in tilted fault blocks and inversion anticlines.

The data, which was acquired in 2019, has undergone KPSDM processing and FWI velocity model building to create an AVO compliant prestack volume that allows explorers to significantly derisk deepwater exploration in this prolific basin.

Saipem wins US\$150mn maintenance services contract in Mozambique

SAIPEM HAS BEEN awarded a contract by Coral FLNG SA, Special Purpose Entity incorporated in Mozambique by Area 4 Partners (Eni as delegated operator, ExxonMobil, CNPC, GALP, KOGAS and ENH) for maintenance services of the floating facility Coral Sul FLNG for liquefied natural gas offshore Mozambique.

Coral Sul FLNG is an innovative and sustainable liquefied natural gas floating facility constructed to produce natural gas from the Rovuma Basin, located approximately 250km northeast of Pemba and 50km from the Mozambique coast.

It is the first FLNG facility operating in ultra-deep waters, connected to an underwater system at a depth of around 2,000 metres.



Image Credit: Arabia Stock

The contract will cover a period of around nine years with one optional year.

The contract is worth approximately US\$150mn with a duration of around nine years, plus one optional year. The activities cover maintenance of the entire FLNG facility and onboard supervision as well as the creation of an onshore logistical base.

The award of this new service contract confirms Saipem's presence in the liquefied natural gas segment, within the scope of the diversification of the project portfolio and strengthens its positioning in a strategic country such as Mozambique.

Eni, Total and Equinor submit proposals for third bidding round in Angola

ENI ANGOLA, TOTALENERGIES and Equinor have submitted bids for Blocks 31/21 and 16/21 in the Lower Congo Basin, respectively.

These Blocks are part of the third bidding round launched by the National Concessionaire for the Lower Congo and Kwanza Basins, on 25 February 2022.

Three of the world's largest oil companies were tendering for two blocks, both located in the Lower Congo Basin, reaching a potential of the initial investment to ensure the execution of the minimum works programme, valued at US\$58.6mn.

Eni Angola submitted a bid for Block 31/21, as operator, with

a 50% interests, in a partnership with Equinor. This bid featured a US\$5mn bonus, with a one-time payment, 30 days after the first oil production in that block.

Equinor submitted a proposal for the same block, with an interest of 50%, as a partner, and a bonus of US\$5mn, to be paid in a single payment.

TotalEnergies presented a bid proposal for Block 16/21, with a 100% stake. The bonus is in accordance with the volume of production accumulated within the Block's development area, within a range of 0.10 cents of a dollar per barrel if the production is less than 200 million barrels, and may reach 0.30 cents per barrel if the production reaches a level equal to or greater than 400 million barrels.



Image Credit: ANPG

The bidding round was launched in Luanda.

Cloudbreak to participate in oil and gas exploration in Namibia

CLOUDBREAK DISCOVERY HAS entered into a Mineral Application Cooperation Agreement (MACA) with Gondwana Petroleum Namibia, Timeworn Investments, Pioneer Oil and Gas Consulting and a Swiss Based Asset Manager (SBAM). The aim is to jointly work towards submission of an application to acquire Petroleum Exploration License 1724 in Namibia.

The financial guarantee will be replaced as soon as practical by a new holding company. In exchange for Cloudbreak's participation as financial partner, it will receive a 10% interest in Block 1724.

Additionally, should the award of Block 1724 be offered by the Ministry of Mines and Energy, the MACA will be replaced by a definitive agreement prior to accepting the award of Block 1724.

Kyler Hardy, president and CEO of Cloudbreak, said, "By deploying our project generation methodology and strategies into the energy sector, Cloudbreak has an opportunity to expand the scope of our exploration and development projects. Recent discoveries by several major and midsized global energy companies in Namibia have opened significant opportunity to participate in new exploration initiatives in the country.

"Our local partners have been exploring and consulting for decades in the region and we are excited to work with them. We look forward to keeping shareholders updated with our progress," Hardy added.

'Global energy spending set to reach record high in 2022, led by oil and gas'

SURGING OIL, GAS and power prices together with the European Union (EU)'s goals of becoming less dependent on Russian supplies and post-Covid-19 pandemic inflation will catapult global energy spending this year to US\$2.1 trillion, according to Rystad Energy.

A concern in energy markets is that the ongoing war in Ukraine will derail the energy transition, but the latest data suggests that spending in green energies will grow faster than in the fossil fuel sector. Without the invasion, however, there would have been less growth in investments in oil and gas and the share of green energies in global energy spending would be slightly more than today's 31%.

Upstream oil and gas spending is now projected to grow 16% – or US\$142bn – compared to last year.

Another important factor pushing energy spending to new highs is the global inflation of material prices, labour costs and shipping rates caused by the pandemic and the sanctions imposed on Russia. Compared to 2020 levels, project costs in oil and gas have increased by between 10% and 20%, due to steel price rises. Within renewables, lithium, nickel, copper and polysilicon – which are all important materials in battery and solar PV manufacture – have sent renewable project costs up by between 10% and 35% within the same timeframe.

CGG and Kent announce strategic partnership

CGG, A MULTINATIONAL geoscience technology services company has announced a strategic partnership with Kent, an integrated energy service provider to work together on realising decarbonisation opportunities through carbon capture and storage (CCUS) development and hydrogen production and supply.

CGG and Kent will be providing customers in the energy and industrial sectors with 'end-to-end' services across the life cycle of the projects. For example, from subsurface characterisation required for storage screening and evaluation to project engineering, planning, construction and commissioning, including late-life activities such as decommissioning and long-term monitoring, that include instrumentation and data management.



Image Credit: Adobe Stock

CGG and Kent will be providing customers in the energy and industrial sectors with 'end-to-end' services across the life cycle of the projects.

This collaboration brings the capability to masterplan entire CCUS clusters. CGG will deploy their world-leading capabilities for subsurface characterisation and subsurface

risk analysis for CCUS and H2 projects as well as monitoring and instrumentation technologies for long-term monitoring and environmental assessment.

Reconnaissance Energy Africa highlights multiple drilling prospects for Kavango basin

RECONNAISSANCE ENERGY AFRICA Ltd has provided an exploration update for the Kavango Basin in NE Namibia and NW Botswana, highlighting

multiple drilling prospects and new play types following the integrated analysis of the two stratigraphic test wells and the first phase of 2D seismic.

The initial exploration and development are being conducted in the first of five sub-basins within the greater Kavango Basin where the company holds petroleum rights over the entire sedimentary basin comprising approximately 8.5 million acres. The work has initially identified five drillable prospects and eighteen leads in the first of five sub-basins. These leads will potentially be matured to drillable prospects driven by the second phase of 2D seismic acquisition currently underway. Six potential reservoirs and four potential source rock intervals have been established in the basin so far. Initial thermal analysis indicates the lower Karoo Rift Fill source rocks should be in the light oil maturation interval.



Image Credit: Adobe Stock

For 2022, ReconAfrica plans to initiate a multi-well drilling programme, beginning with three test wells and a sidetrack of the 6-2 well.

NEW OIL-GAS PLAYS IN MAURITANIAN-SENEGALESE WATERS

Development of Africa's most westerly hydrocarbons province is gathering pace, with growing interest from supermajors (BP, ExxonMobil, Shell and TotalEnergies). Spread over 33,000 sq km, the coast of Mauritania and Senegal holds potential extractable reserves of between 50-100 tcf of natural gas and one billion barrels of crude oil.

The GTA field once fully online will place both countries among Africa's top gas producers.



Image Credit: Adhbe Stock

THE FRONTIER HOTSPOT is part of the MSGBC (Mauritania – Senegal – The Gambia – Guinea-Bissau – Guinea Conakry) Basin and has seen small-scale exploration activity. However, large gas deposits offshore Mauritania/Senegal could make MSGBC Basin (bigger than Guyana Basin) among the most exciting area of frontier exploration to emerge in recent years.

The MSGBC region's flagbearer is the Grand Tortue Ahmeyim (GTA) gasfield – one of the largest deepwater finds (20 tcf) in 2015. The Tortue field

(discovered in 2015) is located in Mauritania offshore block C-8 and is owned by BP (62%), Kosmos Energy (28%) and Société Mauritanienne des Hydrocarbures et de Patrimoine Minier, (SMPHM) (10%). The Ahmeyim field is located on Senegalese side, in the Saint-Louis offshore Profond block

owned by operator BP (60%), Kosmos Energy (30%) and Societe des Petroles du Senegal (Petrosen) 10%. A new well was drilled to a total depth of 4,884 metres (m) in the eastern portion of the Greater Tortue area, which encountered 30m of net gas pay in high-quality Albian reservoir in July 2019. Kosmos Energy

estimates the wider Greater Tortue Complex could hold over 25 tcf of recoverable gas.

Exploration activities by Kosmos Energy identified three different trapping geometries, comprising Tortue West, Tortue East and Tortue North. First contains gas in the lower Cenomanian intervals, while second/third are estimated to hold reserves in the Albo Aptian targets. Work is currently underway in Tortue West; Tortue East and Tortue North will be explored at a future date. The GTA field once fully online will place both countries among Africa's top gas producers.

“ The single largest development underway today is the Greater Tortue Ahmeyim liquefied natural gas (LNG) facility in water depths of up to 2,850m.”

Another sizeable offshore gasfield 'Yakaar-Terranga hub' was drilled in 2017. BP and partners (Kosmos Energy, and Senegal's national oil company, Petrosen), expect to make a final investment decision (FID) before end-2022, according to Ministry of Petroleum and Energy's Director of Hydrocarbons, Thierno Seydou Ly, with first gas expected by 2024. The project will target an estimated 15-20Tcf of natural gas (located in the Cayar block), which will be used for power electrification in Senegal.

Africa's deepest integrated LNG project

The single largest development underway today is the Greater Tortue Ahmeyim liquefied natural gas (LNG) facility in water depths of up to 2,850m (30-year production potential) – jointly developed by BP, Kosmos Energy, Petrosen and SMHPM with BP as the operator. The Intergovernmental Cooperation Agreement signed between BP, Kosmos, and the governments of Senegal and Mauritania provide for a 50-50 split in revenues. The US\$4.8bn project will produce 2.5mn tons of LNG annually, plus 70mn cubic feet of natgas/day by late 2023 under Phase-1 – with potential to expand LNG capacity beyond 10Mtpa in future.

This mega transborder work is one of globe's most complex offshore projects – where gas will be produced from an ultra-deep-water (2,850m) subsea system – comprising of four gas production wells – and processed in the mid-water by a floating production, storage, and offloading (FPSO) vessel with a condensate processing capacity of 500mn cubic feet/day. From there the marketable gas volumes would be transferred a further 30km away to a floating liquefied natural gas (FLNG) facility (developed by Norway's Golar) for possessing, removing the water and impurities prior to liquefaction at a nearshore hub on Mauritania-



The gas-prone acreage of Mauritania and Senegal is poised to become a regional hydrocarbons hub.

Image Credit: Adobe Stock

Senegal maritime border.

The integrated gas value chain and near-shore LNG development will export LNG to global markets as well as supplying gas to Senegal and Mauritania. While initial production from GTA field will be modest, it is projected to double over the medium-term. The field sits within a larger basin of natgas with substantially greater reservoirs.

Oil exploration

Mauritania wants to encourage more exploration specifically in the Taoudenni basin where 15,000km of 2D seismic data are available. Senegal has a dozen offshore blocks (including new ultra-deep waters), which are open to commercial exploitation. A new Petroleum Code updating Senegal's hydrocarbons legal framework was recently passed. The law's profit-sharing mechanisms provide more favourable terms to NOC (Petrosen), including a minimum of 10% stake in exploration-phase projects and a maximum 30% interest when projects reach the development and exploitation stages. The government of Senegal

also approved a new Gas Code to regulate the development of mid-stream distribution solutions for domestic use of gas in energy and manufacturing sectors.

Senegal's biggest oilfield Sangomar (formerly SNE) discovered in 2014 contains both oil/gases, where work started in early 2020 with first oil targeted for late 2023 or early 2024. The field in depths up to 3,000m beneath the sea bed revealed hydrocarbon potential of 630mn barrels of crude oil and 450bn cubic metres of natgas hosted within the Cretaceous-age sandstones. Phase-1 led by Australia-based Woodside Energy focuses on developing the

less complex reservoir units and testing other reservoirs to support gas export to shore – targeting appropriately 230mn barrels of oil, with an estimated production capacity of 75,000 to 100,000 bpd. Total cost of Sangomar project is US\$4.2bn, of which one-fifth will be funded by NOC Petrosen.

In sum, the gas-prone acreage of Mauritania and Senegal is poised to become a regional hydrocarbons hub, based on confirmed reserves, leading to massive increase in gas production over coming years. Both countries will join global LNG exporters' club. Senegal, where oil was discovered in 1961, expects its offshore projects to come online between 2022 and 2026. These various energy projects offer opportunities for monetisation of gas and attract foreign direct investment (FDI) to develop new industries such as petrochemicals, pharmaceuticals, fertilisers as well as power generation. Thus, demonstrating significant development opportunities for the region. ♦

“Mauritania wants to encourage more exploration specifically in the Taoudenni basin where 15,000km of 2D seismic data are available.”

Moin Siddiqi, economist

IS SSA GAS OUTPUT SET TO DOUBLE BY 2030?

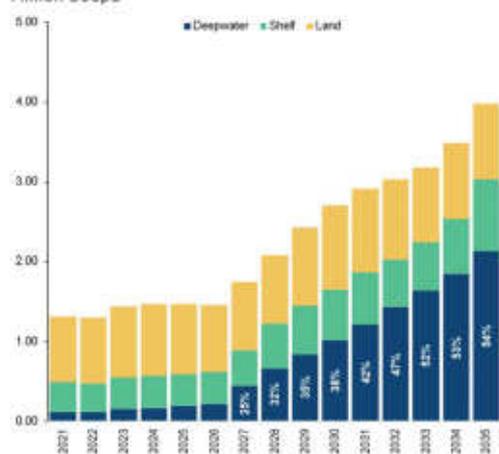
Untapped natural gas supplies in sub-Saharan Africa are set to be unleashed this decade, with output more than doubling from 1.3 million barrels of oil equivalent per day (boepd) in 2021 to 2.7 million boepd in 2030 due to vast undeveloped deepwater resources, Rystad Energy research shows.

WHILE DEEPWATER DEVELOPMENTS have played a crucial role in the region's liquids output to date, averaging about 50% of annual production, gas output from such fields has been minimal. That is expected to change, however, as gas from deepwater reserves will surge in the coming years. Production from deepwater developments will skyrocket from 120,000 boepd in 2021, 9% of total output including shelf and land production, to one million boepd accounting for 38% of total output.

As global demand for gas continues to rise and importing countries suffer supply headaches, the production outlook for the region is promising. Deepwater production is projected to grow further in the 2030s, with gas output more than doubling in five years to 2.1 million boepd by 2035. Gas from shelf and land reserves will increase by 2035 and will contribute about 46% of the

“Natural gas production in sub-Saharan Africa has been historically low, but that looks set to change due to significant undeveloped deepwater finds in countries including Mozambique, South Africa and Mauritania.”

Sub-Saharan Africa natural gas production forecast
Million boepd



Source: Rystad Energy UCube, Rystad Energy research and analysis

Production in sub-Saharan Africa is expected to increase significantly in the coming years.

expected four million boepd of total gas output from the region, based on estimated recoverable reserves, development timelines and plans.

As a result of the booming production outlook, greenfield investments are also projected to soar. Gas and liquids greenfield capital expenditure

in the region totalled US\$12bn in 2021, with US\$8bn spent on deepwater developments. By 2030, total greenfield investments will surge to almost US\$40bn, of which US\$24bn will go on deepwater projects.

“Production in sub-Saharan Africa is expected to increase significantly in the coming years, with natural gas output in particular set to see a boom in output. Although there have been notable onshore finds, the development of deepwater offshore resources is going to usher in a period of rapid growth for the region,” said Siva Prasad, senior upstream analyst with Rystad Energy.

Sub-Saharan Africa deepwater recoverable natural gas resources by country

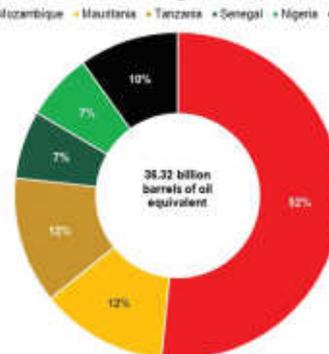


Image Credit: Rystad Energy

Deepwater developments are the key driver

Natural gas production in sub-Saharan Africa has been historically low, but that looks set to change due to significant undeveloped deepwater finds in countries including Mozambique, South Africa and Mauritania. Deepwater reservoirs tagged to TotalEnergies' Area 4 LNG project in Mozambique, where trains 1 and 2 are expected to start production in 2028, hold an estimated 2.3 billion barrels of oil equivalent (boe) in gas reserves. South Africa's Brulpadda field – also operated by the French major – holds 715 million boe, while the BP-operated Greater

Tortue Ahmeyim floating liquefied natural gas (FLNG) development straddling the maritime boundary of Mauritania and Senegal has an estimated 300 million boe.

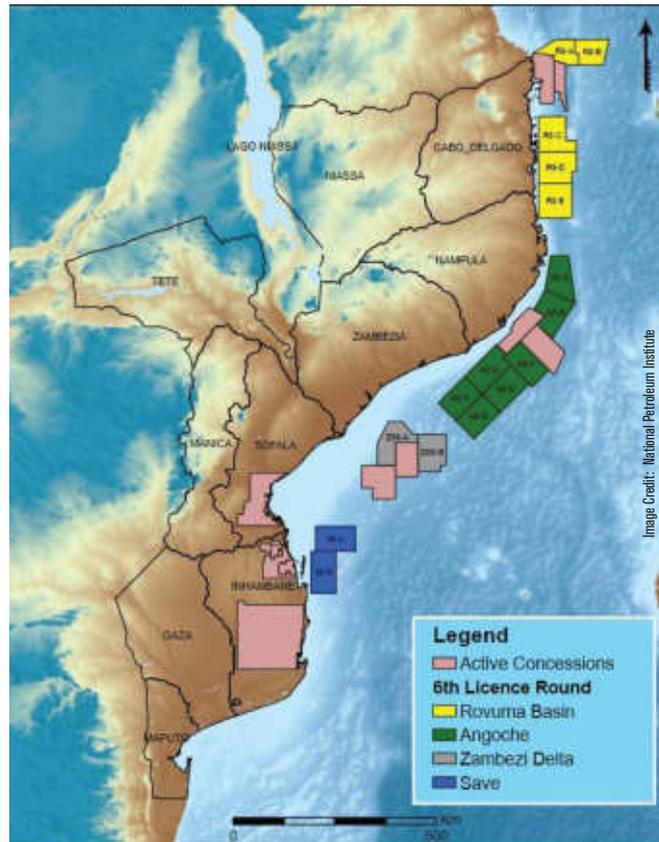
Of the current potential recoverable reserves across sub-Saharan Africa, about 60% lie in deepwater regions, of which close to 60% is gas. Mozambique dominates with 52% of the total recoverable gas resources in the area, followed by the Senegal–Mauritania maritime region with a combined 20% and Tanzania with about 12%. Nigeria also holds significant recoverable reserves of gas that will contribute to the expected output hike.

On the flip side, sub-Saharan African liquids production is expected to drop below four million barrels per day (bpd) for the first time in more than 20 years but will recover by 2028 and return to 2020 levels of around 4.4 million bpd by the end of the decade. Liquids output is projected to grow in the 2030s, too, with total production of approximately 5 million bpd in 2035.

About 40% of the total recoverable deepwater resources in the region are liquids, of which Nigeria accounts for 33% and Angola has 31%. Ghana and Mozambique are two other countries with significant untapped resources, amounting to 8% and 7%, respectively, of the region's deepwater liquids reserves.

Deepwater projects in sub-Saharan Africa are, however, risky and can be delayed or unsanctioned due to high development costs, challenges accessing financing, issues with fiscal regimes and other above-ground risks. With majors continuing to rein in upstream spending and plow a course on the energy transition to help lower emissions, many deepwater schemes will face challenges getting off the drawing board.

Majors are, overall, focused on cutting upstream costs, reducing emissions, increasing



The Mozambique sixth licensing round was launched in November 2021 in Maputo.

renewables and the energy transition, meaning such deepwater projects often have to take a backseat when it comes to apportioning investment. European banks are tightening regulations for funding high-emission hydrocarbon projects, and African banks could struggle to provide the necessary financing. This leaves Asian banks – mainly Chinese – with comparatively less strict regulations on funding fossil fuel developments.

Recent developments in Mozambique

Mozambique has pre-qualified 12 companies for the sixth licensing round, of which six as operators

and the remaining six as non-operators.

Operators are: CNOOC Ltd, Sinopec International Energy Investment, ENI Mozambique, ExxonMobil Mozambique (Offshore 6), Petro China International Iraq, Total Energies EP New Venture. Non-operators are: RN Angoche, NOVATEK, Qatar Petroleum Mozambique, Sasol Africa, ONGC Videsh and Discovery Exploration.

The Mozambique sixth licensing round was launched in November 2021 in Maputo. Bid proposals are to be submitted by 30 August 2022. According to the approved timetable, the results will be published on 30 November 2022.

“Mozambique has pre-qualified twelve companies for the sixth licensing round, of which six as operators and the remaining six as non-operators.”

“Coral Sul FLNG is an innovative and sustainable liquefied natural gas floating facility constructed to produce natural gas from the Rovuma Basin.”

In another major development, Italian multinational oilfield services company Saipem has been awarded a contract by Coral FLNG SA, Special Purpose Entity incorporated in Mozambique by Area 4 Partners (Eni as delegated operator, ExxonMobil, CNPC, GALP, KOGAS and ENH) for maintenance services of the floating facility Coral Sul FLNG for liquefied natural gas offshore Mozambique.

Coral Sul FLNG is an innovative and sustainable liquefied natural gas floating facility constructed to produce natural gas from the Rovuma Basin, located approximately 250km Northeast of Pemba and 50km from the Mozambique coast.

It is the first FLNG facility operating in ultra-deep waters, connected to an underwater system at a depth of around 2,000 metres.

The contract is worth approximately US\$150mn with a duration of around nine years, plus one optional year. The activities cover maintenance of the entire FLNG facility and onboard supervision as well as the creation of an onshore logistical base.

The award of this new service contract confirms Saipem's presence in the liquefied natural gas segment, within the scope of the diversification of the project portfolio and strengthens its positioning in a strategic country such as Mozambique. 🔴

IS NAMIBIA A GLOBAL HOTSPOT FOR EXPLORATION?

Two significant oil discoveries announced by Shell and TotalEnergies in February 2022 have opened multiple new oil plays offshore Namibia. The excitement is understandable, but how significant could the breakthrough prove to be and what challenges need to be overcome to realise the potential? Analyses Westwood Global Energy Group.

BETWEEN 2006, WHEN the giant Tupi field was discovered, opening the 30 billion barrel pre-salt play of the Santos basin in Brazil, and 2021, around US\$30bn has been spent trying to open new plays in 116 basins around the world. Of the 16 new commercial oil plays that have emerged, the Liza play in the Upper Cretaceous of the Suriname-Guyana basin is by far the biggest, at approximately 10 billion barrels, with the rest appearing to plateau at approximately two billion barrels of oil or less.

What is known so far about the Namibia discoveries? On 4 February 2022, Graff-1 was reported to have made a light oil discovery in what are assumed to be Upper Cretaceous sands in block 2913A. There are unconfirmed reports of a approximately 60m hydrocarbon bearing interval and a potential commercial resource of approximately 300mboe. Shell is currently drilling a second well at La Rona, which is likely to be appraising the discovery prior to confirmation of the potential for a commercial development. Latest rumours suggest that Graff could have one billion barrels of oil and 5-6Tcf of gas.

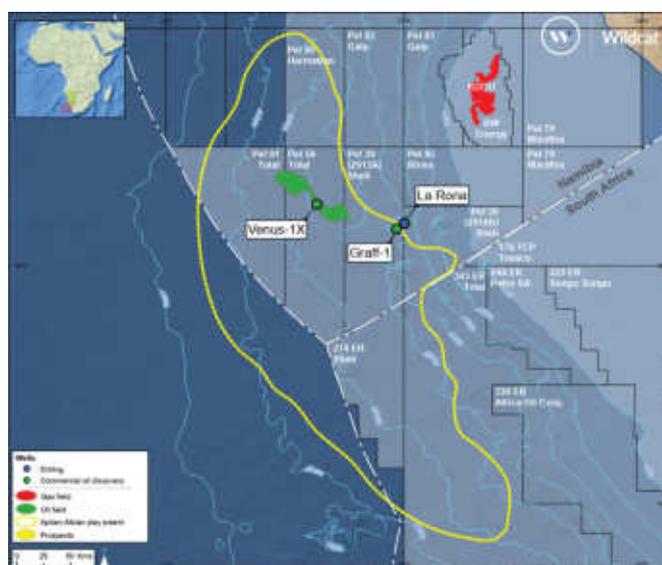
The discoveries are a long-awaited breakthrough for Namibia, and potentially also for

South Africa into which the Orange Basin extends. So how big could the prize be?

The discoveries have proved the presence of a prolific oil kitchen and the analysis suggests that the Lower Cretaceous Venus play has a potential extent of up to approximately 58,000 sq km, comparable to that of the Upper Cretaceous of Suriname-Guyana. A Suriname-Guyana scale oil province is certainly possible provided that the traps are present and the deepwater reservoirs are widespread and of good enough quality. All the prospective acreage looks to be already taken under fiscal terms reflective of the high-risk frontier nature of the basin prior to the discoveries. What few opportunities for new entrants exist will now carry a significant premium.

The Venus discovery is approximately 325km from the coast and in 3000m water depth and is set to be the deepest water development globally to date. Shell currently operates the world's deepest water development at Stones in 2900m of water in the US Gulf of Mexico. Deepwater adds cost and engineering complexity to the installation and operation of any project.

The deepwater challenges may be exacerbated by potentially high gas content within the discoveries. Although no detailed information on the properties of



Offshore Namibia and South Africa are showing licenced acreage, block operators, possible extent of the Aptian-Albian play fairway and recent discoveries.

the hydrocarbons discovered has been reported, TotalEnergies report associated gas, suggesting either the presence of a free gas cap or a high gas-oil ratio, where significant volumes of gas are dissolved within the liquid hydrocarbons. Development wells will have to avoid any gas cap that may be present. Produced gas will have to be carefully managed and may require reinjection back into the reservoirs until an economic way to produce the gas and take it to market can be established.

Venus is reported to have an areal extent of approximately 600km. The discovery well

encountered an 84m hydrocarbon column, potentially within the thickest part of the reservoir. Away from the discovery well it is likely that the hydrocarbon column is thinner, making economic production more challenging.

The trap at Venus is understood to be a complex combination trap involving both stratigraphic pinch outs and faults. The complexity may be key to the size of Venus and the configuration may be unique. While it is highly likely that other traps do exist in the basin, individual pools may be smaller than Venus. ♦

HSE CONSIDERATIONS FOR OIL AND GAS SECTOR'S 'NEW NORMAL'

Dr Raymond Ruthvin, regional medical director at International SOS has highlighted the importance of health and safety considerations for the oil and gas industry, and how International SOS is helping oil and gas operators in Africa combat foreseeable risks and ensure stringent measures to enforce safety systems at the facilities. Deblina Roy reports.

SPEAKING ON HOW COVID-19 will continue to affect the oil and gas industry – both operationally and financially, Dr Ruthvin said that the pandemic has definitely had a negative impact on the oil and gas industry as well as the entire value chain. However, the industry has adapted to the situation quite quickly and quite well. In fact today, the industry is facing very little risk in terms of COVID-19. Additionally, authorities are enforcing many initiatives to contain the spread.

African governments are taking proper measures to curb the disease, while oil and gas operators are also putting in place a number of initiatives to keep the facilities and the employees safe such as the setting up of vaccination and screening programmes and proper quarantine facilities for infected workers.

International SOS is also helping several major organisations look after the health and safety of employees, as well as personal travellers and their families. “Our clients span a range of industries including energy, mining and large-scale construction, aviation and maritime, banking and finance, government and non-governmental organisations,” says Ruthvin.

“In Nigeria, International SOS



Dr Raymond Ruthvin, regional medical director at International SOS.

has been operating since 1994. Today we support and assist our clients across the country on close to 30 remote sites and we have established clinics in Lagos and Port Harcourt. Through this

investment in medical care, corporations, individuals and their families are able to receive preferred access to our clinics through our clinic plan programmes. Our medical

“ African operators are putting in place a number of initiatives to keep the facilities and the employees safe.”

personnel also have specialised expertise in fields including tropical medicine, trauma and emergency medicine. Available 24/7, they are able to respond rapidly to any medical situation that may arise.”

International SOS seeks to provide timely and quality health care to the employees, which has a direct impact on improving productivity and reducing lost time injury (LTI). Furthermore, by improving on-site diagnostics and care, International SOS also helps companies reduce the number of expensive failed assignments and limit costly employee replacements.

To promote the enhancement of the HSE performance of oil and gas companies, Ruthvin explains that International SOS has developed a stringent injury and illness case management methodology and support system, in line with industry standards such as IADC and OSHA.

While the world recovers from the effects of the pandemic, continuous and rigorous health management has become ever so important – especially in hazardous sectors. “At International SOS, we are committed to providing quality health services to companies in the oil and gas sector to improve efficiency and productivity,” concluded Ruthvin. ♦

RIGHT PUMP MAXIMISES ENERGY EFFICIENCY

Paul Davis, Wanner International's managing director, highlights the importance of sustainable pumps in the oil and gas industry, and how Hydra-Cell pumps help the oil and gas industry in reducing the carbon footprint. Deblina Roy reports.

Deblina Roy (DR): What are the challenges that the oil and gas industry is facing due to the lack of sustainable pumps?

Paul Davis (PD): The global shift towards more sustainable energy is driving technical advancements and developments within a range of industries operating pump technology, the oil and gas industry is no exception.

Currently within industries which use pumps intensively, pumps can account for as much as 50% of the energy usage. This makes it vital to choose the right pump and fully maximise energy efficiency. With sustainability at the forefront of a lot of businesses minds optimising energy usage has never been so important.

In contrast to Hydra-Cell, alternative pump technologies suffer with inherent internal losses such as mechanical friction and internal 'back flow,' which increases as internal parts wear and liquid viscosity reduces, starting to become less efficient as the discharge pressure goes above 10 bar and worsens with increasing pressure.

“ Reducing the carbon footprint is an important aspect of the oil and gas pumps.”



Image Credit: Wanner International

Hydra-Cell seal-less pumps offer a cost-effective solution compared to other pumps.

DR: How do Wanner's Hydra-Cell pumps help the oil and gas industry in reducing the carbon footprint?

PD: Wanner International is dedicated to enabling its customers to save energy and resources. The flexibility of the Hydra-Cell pump to handle many different liquids and many different applications enables effective repurposing, coupled with its high energy efficiency and reliability has a large role to play in reducing the carbon footprint.

The Hydra-Cell pump's true positive displacement action and minimal internal energy losses

achieve high efficiencies from pump shaft to hydraulic power; this combined with the wide range of flow rate controllability ensures optimum energy usage.

We recently replaced a major US Oil and Gas companies existing Api674 plunger pumps with Hydra-Cell pumps to reduce Hydrocarbon emissions and operating costs within the Natural Gas Liquid transfer operation.

DR: How does Hydra-Cell stand out in terms of cost-effectiveness?

PD: Not only do the Hydra-Cell seal-less pumps offer performance benefits they also

offer a more cost-effective solution than other pumps, such as API 610 multistage centrifugal pumps and traditional piston diaphragm process pumps. When compared with traditional API 675 metering pumps, Hydra-Cell "pulse-less" metering solutions are best-in-class for Life Cycle Cost with lower acquisition costs, energy consumption and minimal servicing.

Thanks to its hermetically sealed design the Hydra-Cell pump is able to reduce maintenance and repair costs, minimising the cost of spare parts when compared with other pumps. ♦

BUTEC completes takeover of ENGIE's 17 Energy Services companies in Africa

THE UAE'S BUTEC has completed the takeover of 17 Energy Services companies in Africa previously owned by the energy global player, ENGIE Group.

The acquisition process was completed on the 31 March 2022, following the initial agreement signed on the 16th of last December between the two groups.

The acquisition of these 17 companies, based in 15 countries across Africa stems from the strategic decision taken by BUTEC Group, a major EPC projects player since 1960s, to expand to Africa, the geographic footprint of its second core business line: the multi-technical services.

This transaction is expected to allow BUTEC Group to capitalize on 2000 collaborators and highly skilled executives, whose expertise will strengthen the company's Energy Services activities,

through key synergies. It is worth noting that some of the newly acquired company were established since the early years of the 20th century and have extensive experience in the field of multi-technical services installation and maintenance in their respective countries.

ENGIE on the other hand has decided to sell its Energy Services activities to Bouygues in Europe and to BUTEC Group in Africa, in line with its decision, taken in 2020, to redefine its strategic priorities to focus on green energy generation and distribution.

The newly acquired companies are:

In North Africa, ENGIE Service Morocco, a merger between SPIE Morocco, Cofely Morocco and EFS, these companies are leaders on their markets in North Africa and major players in energy transition.

In West Africa, ENGIE subsidiaries in Ivory Coast, Benin, Burkina Faso, Ghana, Mali and Niger. These companies occupy a leadership position in engineering, utilities installation and energy efficiency services, as well as in the manufacturing of electrical components.

In Southern Africa, Ampair, Thermair and IES operating in South Africa, Botswana, Mozambique, Swaziland and Zambia. Operational for more than 70 years, these companies have been leaders in the field of climate engineering and in the installation and maintenance of HVAC systems.

BUTEC Group now based in Dubai is a major player in the MENA region, in the EPC construction businesses and multi-technical services. The founders and the management hold its capital, with a minority stake held by the IFC.





Performance Matters

<p>Lubricant Additive Packages</p> <ul style="list-style-type: none"> • Automotive Engine Oil • Transmission & Gear Oils • Industrial Engine Oils • Marine Engine Oils • Viscosity Index Improver • Industrial Oils • Additive Components 	<p>Chemical Raw Material</p> <ul style="list-style-type: none"> • Distilled Animal Tallow • Hydrated Lime Powder • Rice Bran Fatty Acid • Lithium Hydroxide • Sodium Hydroxide Soap • HCO • Technical Grade Urea 	<p>Base Oils</p> <ul style="list-style-type: none"> • Group I /II/ III/ IV • Pale Oils • Napthenics • Re-refined Base Oils 	<p>Private Label</p> <ul style="list-style-type: none"> • Lubricants • Greases • Brake Fluid • Coolants
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PerformanceSe Oils and Chemicals LLC
 Off : 8 | Janata Indl Est., Opp. High Street Phoenix, Lower Parel, Mumbai, India. Tel : +91 22 24945624, 24944108 | Email: info@performanseoil.com | www.performanseoil.com

WHAT'S DRIVING DEMAND IN O&G PIPELINE COATINGS MARKET?

Nikhil Kaitwade, associate vice-president – market research at Future Market Insights, has highlighted the trends in global oil and gas pipeline coatings market, as the industry is projected to register a CAGR of 5.6% through 2029.

IN THE LAST few years, there has been a paradigm shift in coating technologies, along with an increase in global energy consumption and proliferating oil and gas pipeline projects. Fossil fuel-based electricity generation covered 45% of additional demand in 2021 and is set to cover 40% in 2022.

Furthermore, the US Energy Information Administration projects nearly 50% increase in world energy use by 2050. Due to this, countries are facing the pressure of accelerating oil and gas production. According to the report published by Future Market Insights on the global oil and gas pipeline coatings market, the industry is projected to register a CAGR of 5.6% through 2029.

To cater to the increasing demand from consumers and a simultaneous shortage of oil and gas at a global level, African countries are exploiting their natural resources to fulfill the growing demand. Sales prospects are normalising since 2021, presenting lucrative opportunities for the African market for oil and gas pipeline coatings industry from several onshore and offshore application areas.

Energy consumption is one of the key economic drivers in Africa. The country has seen an inconsistent GDP in the past but the potential of the oil and gas

sector will add to the overall economic growth in coming years.

Oil and gas downstream turns out lucrative

The downstream segment accounts for the largest share in the application of oil and gas pipelines coatings across the African market. According to the Organization of Petroleum Exporting Countries (OPEC), with respect to downstream projects, Africa's local refining capacity is expected to increase, with a corresponding reduction in imports, with long-term demand growth expected to yield about five million barrels per day throughout in 2045.

Downstream pipelines networks are the largest, owing to direct transportation to end-use industries and consumers. Analysts at Future Market Insights project the downstream segment to create an absolute dollar opportunity of more than US\$1,371.3mn by the end of 2029 in the overall market for the oil and pipeline coatings market.

Digitisation of oilfields to propel growth

Digital oilfield solutions can enhance operational performance and decision-making process, thereby improving ROI. Companies are increasingly investing in the digitisation of oil and gas sectors in African countries. Introduction of remote

monitoring solutions and control centers help in the elimination of routine visits and enables geologists, engineers and operations professionals to work from any location, adding to the overall demand for oil and pipeline coatings.

Over the past few years, Nigerian oil and gas refineries have started to transform digitally. Recently, Avanceon, in partnership with PE Energy Limited (PEEL), secured the

“Digital transformation hold significant importance to African oil and gas operators”

contract for providing digital oilfield solutions to revive the Kalaekule oilfield in Nigeria.

Huawei announced the launch of its fully digital oilfield IOT solution at the Nigeria International Petroleum Summit 2020. The company believes that this solution, which uses 4G eLTE broadband and Artificial Intelligence technology, will offer full wireless network coverage to enhance the operational transparency and safety of the oil and gas sector in Nigeria covering the oil fields, depots and pipelines.

For instance, in 2020, Akselos SA announced the deployment of a structural Digital Twin, and is based on Akselos' patented RB-FEA technology, for Shell's Bonga Main FPSO in Nigeria. The Digital Twin is a physics-based model which represents the physical conditions of an oil rig and other parts. The model is updated with the ability to monitor the overall health of the equipment. It is also capable of carrying out structural assessments based on the condition, from anywhere and at any time.

In conclusion

African oil and gas companies have only recently started deploying newer technologies but the digital transformation, now, holds significant importance in the country.

The market for oil and gas pipelines is highly influenced by major oil and gas companies such as Shell and Equinor. These companies are putting in a considerable amount of innovation in developing technologies to make digital oil and gas fields a reality. Furthermore, major acquisitions and collaborations to ensure long-term sustainability in the industry are paving way for profits. ♦

www.futuremarketinsights.com/reports/oil-and-gas-pipeline-coatings-market

RUN-TO-FAILURE MAINTENANCE

Deblina Roy catches up with Mika Tienhaara, CEO of ROCSOLE, regarding the issue of production shutdowns and operational delays. Tienhaara also speaks about how ROCSOLE is providing solutions to reduce OPEX, avoid unplanned shutdowns and support automated, digitalised and unmanned platform operations.

Deblina Roy (DR): What are the main reasons for production shutdowns and delays for oil and gas operations these days?

Mika Tienhaara (MT): Unscheduled and unexpected production shutdowns, especially in processing plants, are costly and time-consuming. Around 25% of US gulf coast shutdowns are planned, and 75% are unplanned, with a loss of close to US\$650bn per year in unplanned equipment outages.

Why is this occurring? The run to failure is the critical issue. Globally, more than 60% of operating assets are aging. They have been in operations for 20 years or more. This makes operating and production conditions much more severe today. Also, these facilities have, for instance, water breakthrough, meaning a lot of water production compared to the oil production rate. This means such facilities also have to deal with sand and solids and all the contaminations carried from production fluids. These solids can cause erosion, corrosion and leakages, making it even more challenging for the facilities to make processing efficient to reach the production quality.

Therefore, reducing or altogether avoiding the risk of production shutdown means more oil; more oil means more revenue — millions and millions of dollars annually.

DR: In your opinion, how oil and gas companies can operate more efficiently and avoid lengthy shutdowns and costly maintenance?

MT: In North America, there were 340 active refineries in 2019. According to statistics, they had more than 2,000 unplanned shutdowns in a single year. To deal with this, it's essential to enable operational efficiency measures, including predictive modeling. ROCSOLE's solutions with sensors and digitalisation can



Image Credit: ROCSOLE

Mika Tienhaara is the CEO of ROCSOLE.

help facilities with outdated equipment to improve the efficiency. ROCSOLE also helps automate the critical processes while creating robust base solutions.

The activities of oil and gas are quite carbon-emission intensive. With a

“ The oil and gas operators need to digitalise their systems to quantify and characterise solid deposits in piggyback flow lines and pipelines.”

documented increase of 10% inefficiency, you will reduce the total emission level by 4%. In oil and gas, there are fugitive emissions from malfunctioning equipment, leakages, etc. If you look at critical processing equipment like multiphase separators, the primary root cause of the failure is faulty instrumentation.

The oil and gas operators need to digitalise their systems to quantify and characterise solid deposits in piggyback flow lines and pipelines. A digitalised system can maximise production throughput, optimise your pigging programme from the number of runs needed to the sizes used, detect blockages in the early phase to avoid significant costs caused by blockages, and improve the efficiency of integrity campaigns by identifying what deposits are present and where.

DR: How is ROCSOLE providing solutions to reduce OPEX, avoid unplanned shutdowns and support automated, digitalised and unmanned platform operations?

MT: The largest share of carbon emissions from oil and gas comes from scope 3, meaning the use of the products. It affects the users as we burn so much for fossil fuel. So we have to find other ways, for example, energy sources from renewable, etc. How to improve OPEX and operating efficiency? With AI & deep learning prediction solutions, we support operational teams to reduce OPEX, avoid unplanned shutdowns, and monitor product quality to increase revenues. Our field-proven applications include emulsion, deposition, sand, and flow regime-related imaging, and our services are applied on offshore and onshore pipelines, tanks, and separators. We aim to support automated, digitalised and unmanned platform operations. ♦

REAL-TIME WELL TRAJECTORY DURING DRILLING

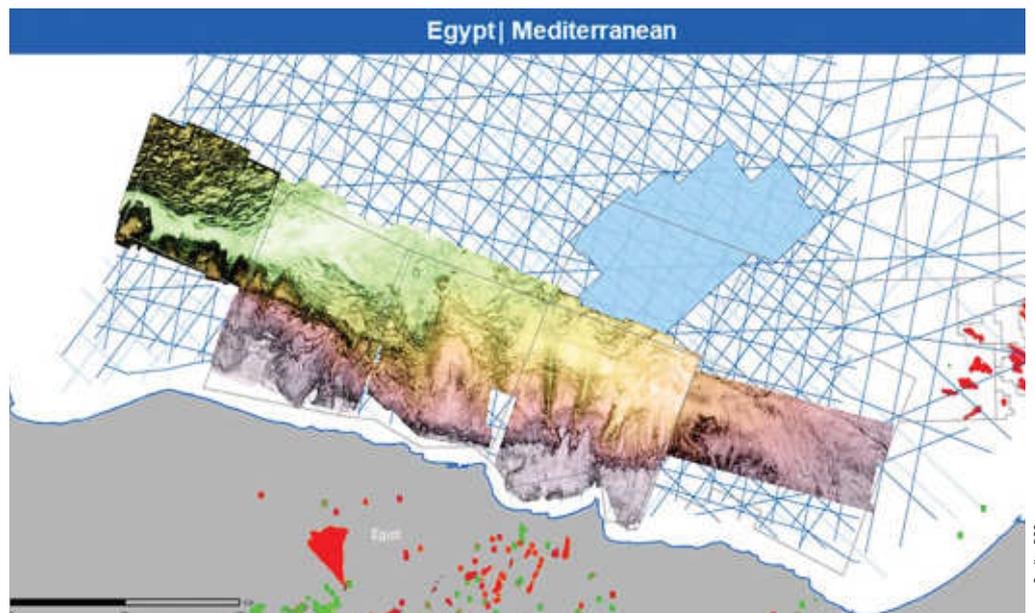
With the size of seismic data growing exponentially, operators are moving high-performance computing workloads to the cloud and have developed innovative data compression methods.

AFRICAN OPERATORS ARE constantly looking for ways to improve acquisition, processing and interpretation methods by leveraging the power of digitalisation to improve workflow efficiency and reduce model uncertainties.

In achieving the goal, a number of African oil and gas operators are conducting seismic surveys, both onshore and offshore to boost exploration as well as production. Using high-performance computing, cloud, artificial intelligence, machine learning and advanced visualisation, such seismic surveys not only unlock new insights into complex geology but also reduce cycle times from exploration to production.

For example, PGS' five 3D seismic surveys to its data library offshore Egypt aims to create new broadband 3D coverage of more than 18,700 sq km in recently awarded nearshore license blocks. The time-

“ The surveys enable the operators to identify prospects that are best aligned with their exploration goals.”



This topographical map, showing detailed seabed surfaces offshore Egypt, is based on recent MultiClient 3D seismic data acquired by PGS (a small part of a reprocessed legacy dataset is included). Additional reprocessed legacy 2D and 3D plus GeoStreamer 2D data are represented by blue polygon and lines.

migrated data is available now, while final depth data will be ready in May 2022. This new 3D data provides detailed insights into opportunities that complement the regional geology and structural foundation provided by MultiClient 2D seismic available for this region. This enables operators in this area to identify prospects that are best aligned with their exploration goals.

Also, Namibia's oil and gas exploration company Monitor Exploration has commenced the environmental impact assessment (EIA) and environmental

management plan (EMP) engaging risk-based solutions (RBS) of Dr Sindila Mwiya and his team. Upon completion, monitor will be granted a clearance certificate, mandatory for onshore Namibia, for conventional seismic operations over PEL 93. The company expects to obtain this authorisation by May-June 2022, and schedule to proceed with the seismic operations immediately after. The objective is to cover all three AOIs identified successfully within the company's licence. This is set to help to understand the nature of the trends seen on

the gravity and other data.

Results from a 2D Seismic Survey of the Cabora Bassa area in Zimbabwe are showing signs of natural gas and crude oil deposits, Australian independent upstream oil and gas firm Invictus Energy has announced. Invictus Energy partnered with Canadian-based consulting firm Earth Signal Processing to process data from its CB21 survey, which the firm started in 2021, to reprocess 1990s seismic, gravity, geochemical and aeromagnetic data acquired from American oil and gas major ExxonMobil. 🔴

DANGOTE REFINERY: BOOSTING NIGERIAN ECONOMY

Originally scheduled to come on stream in 2019, Nigeria's flagship Dangote refinery project is nearing completion with start up now anticipated this year. The scale of the venture brought together a small army of contractors from around the globe to get the job done. Marin Clark and Deblina Roy report.



This 650,000 barrels per day (bpd) refining facility is expected to redefine Nigeria's domestic fuels production.

Image Credit: Mammet

FOR A MULTI-BILLION dollar project like Nigeria's flagship Dangote refinery, which is scheduled to come on stream later this year, it takes an army of contractors to get the job done.

And it is quite a job.

This 650,000 barrels per day (bpd) refining facility is expected to redefine Nigeria's domestic fuels production. Despite being a leading crude oil producer, the West African country has long been dependent on imported

fuels to meet domestic demand.

That could be about to change with the new refinery, which is under construction in the Lekki Free Zone near Lagos.

The huge project site covers a land area of approximately 2,635 hectares, about six times the size of Victoria Island.

Strategic project

When it launches, the Dangote refinery is expected to be Africa's biggest oil refinery and the world's largest single-train facility.

Its pipeline infrastructure

alone is the most extensive anywhere in the world, with 1,100 km to handle the flow of crude oil, plus 3 billion standard cubic feet of gas per day.

In addition, the refinery boasts a 400 megawatts (MW) power plant that is able to meet the total electricity requirements of Ibadan DisCo, the local distributor.

When the project finally comes on stream, it should meet 100 percent of Nigeria's requirement of all refined products, as well as generate a surplus for export.

Nigeria's fuel supply squeeze is

in large part down to the dilapidated state of its older, existing refineries.

Key challenges

But there have been plenty of challenges along the way in getting lift off at Lekki.

A launch date is yet to be set, though it is expected to be during 2022, while cost overruns have also impacted the scheme — a common challenge among mega projects such as export refineries and liquefied natural gas (LNG) plants.

According to media reports, the overall cost has ballooned to US\$19bn from Dangote's earlier estimates of around US\$12-14bn.

Construction has also been impacted by delays arising from the Covid-19 crisis, which presented challenges for all businesses, including contractors working at the site.

Contractor team

The contractor team is as vast and diverse as the Dangote refinery project itself.

It includes Germany's MAN Diesel & Turbo supplying two compressor trains as part of a contract valued in the double-digit million dollars.

The highly efficient machinery trains each consist of an axial compressor driven by a steam turbine with about 30 MW of power. Delivered with a comprehensive auxiliary package, they will come into operation for the refinery process of Fluid Catalytic Cracking (FCC), thereby supporting the production of fuel.

The full team of contractors putting the finishing touches on the refinery is simply immense. Other well-known companies playing a supporting role on this ground-breaking scheme include Hyundai Heavy Industries (HHI), Sulzer Chemtech, SOFEC, Schneider Electric and Wabag, among countless others.

It's a trusted position for all, given the importance of the project to the economies of both Nigeria and the West Africa region as a whole.

Heavy lifting

One of the most important support stars behind this mammoth of a project is heavy lifting specialist Mammoet. The privately-held company is a world beater in engineered heavy lifting and transport of oversized and heavy objects. It's long been a familiar face on some of the world's largest oil and gas projects.

It was originally assigned a

Mammoet set a record moving the 3,000 ton regenerator.



Image Credit: Mammoet

contract for transporting, lifting and installing all over-dimensional cargo for the refinery, though its work has also moved into other areas too. It meant working closely together with its Nigerian partner Northridge Engineering.

Highlighting the scale of the challenges involved, Mammoet and its team set new records during their work on the project, including moving a 3,000-ton regenerator, which is the heaviest item ever to be transported over a public road in Africa.

Mammoet's meticulous level of planning and execution, along with the strong support of its Nigerian partners, ensured all vital components were delivered to site safely and on schedule.

Ground reinforcement

Its successful work here resulted in other awards as well. Mammoet Heavy Duty Pavement, a subsidiary company of Mammoet, landed a contract to provide ground reinforcement at the site.

The refinery will be the largest commercial project to date to use Enviro-Mat, Mammoet's innovative and

sustainable solution for ground reinforcement.

Such a large-scale project requires extensive ground preparation works before any lift can take place. Enviro-Mat provides an efficient, cost-effective and sustainable alternative for ground reinforcement. Combined with the native soil and cement, the Enviro-Mat additive increases the ground bearing capacity up to 50 tons/m².

It is also quick to install and therefore offers particular advantages on sites where ground reinforcement is required on a large area within a short timeframe. In this case, Mammoet is applying the product to lay down areas, hard stands and crane pads equating to over 500,000 square meters of the site, which is located on reclaimed swamp land.

"As Mammoet's presence in West Africa grows, it is a great flexible solution for projects in the region – and Africa in general – because it is easy to transport to site, and it is quick and less disruptive to install," said Ronald Kleinjan, director Mammoet Heavy Duty Pavement.

Project start

As the project nears completion, many key contractors such as Mammoet have begun to wind down operations at the refinery.

With the final 1,240t propylene mounded bullet installed at the refinery and petrochemical complex, it announced that it is demobilising equipment that has been deployed there over the past several years.

It concludes another successful project completed safely and delivered on time for the Mammoet specialists. The company was originally contracted to assist in the construction of the refinery in 2018, with a scope of work consisted of receiving, inland transport, on site lifting and installation of hundreds of components.

Like the other hundreds of contractors who have similarly played a role in this immense undertaking — and for Nigeria itself — it will be an immensely proud moment when the Dangote refinery finally roars into life.

Booting Nigeria's hydrocarbon sector
Switzerland-headquartered

Sulzer Chemtech has been selected as the sole supplier of column internals, packings and trays for the Dangote integrated oil refinery and petrochemical complex in Lekki Free Trade Zone, near Lagos, Nigeria.

Ramann Sundaresan, director sales – separation technologies, MENA market, said, “Nigeria, historically, has been a “net importer” in terms of Petroleum products. Though the export of crude oil is considerable, due to fluctuations in the price of oil (especially the two recent steep fall in prices), the trade balance gets affected. Nigeria depends on imports largely for Petroleum products like Diesel, Kerosene, Gasoline etc. to meet the growing urban population.

“The Dangote refinery implementation foresees achievement of the twin objectives of utilizing its own crude oil to turn in to value added products and helping to reduce the trade imbalance to a good extent when it comes on stream. Also, major part of the African continent which has seen a growth in urbanization will need fuel for this growth and Dangote refinery assures a ‘local supplier’ to meet this need thus making the refinery a very attractive proposition.

Also a project of this size generates immense employment opportunities for local population and helps general economic growth, centered around the nation’s core strength of crude oil and petroleum products.”

Speaking about the benefits Sulzer will get as a key stakeholder in the project, Sundaresan commented, “Sulzer has always been in the fore front of bringing latest technologies and product improvements to the energy sector over the years. Being the supplier of all the column internals to the Dangote refinery helps Sulzer achieve their main business principle of ‘Customer Partnership.’

“The swiftness with which



Installation of LPG bullet.

design changes were handled and adapted solutions proposed and implemented by Sulzer Chemtech during the execution of the project, helped us gain the position of a Reliable Partner in Dangote’s diversification and growth story. This, we expect, will help Sulzer Chemtech and Dangote to continue as strategic associates in future expansions and revamps that may be required based on changing market conditions such as stringent fuel quality requirements.”

MAN Energy Solutions is delivering its compression technology for the Dangote project. According to Uwe Emmerich, head of sales petrochemicals at MAN Energy Solutions, “This refinery project is underlining the long-term growth perspective Nigeria and the region of West Africa have. It

will enable the country of Nigeria as Africa’s biggest crude oil producer to raise its processing capacities, getting more independent from imported fuels.”

Emmerich further added, “It’s a great opportunity for us to be a part of this important project in Nigeria. MAN Energy Solutions is glad to provide its reliable technology equipment and expertise in order to help to make the Dangote refinery not only the biggest but also one of the most efficient refinery operations on the African continent.”

Speaking exclusively with Oil Review Africa, Engineers India Limited (EIL), stated, “Nigeria, over the last few decades, has been net importer of petroleum products to meet its domestic consumption requirement.

However, with the installation of

Dangote Refinery project with capacity of 650,000 bpd, the largest grassroot refinery project in Africa, the country would attain self-sufficiency in domestic fuel requirement.”

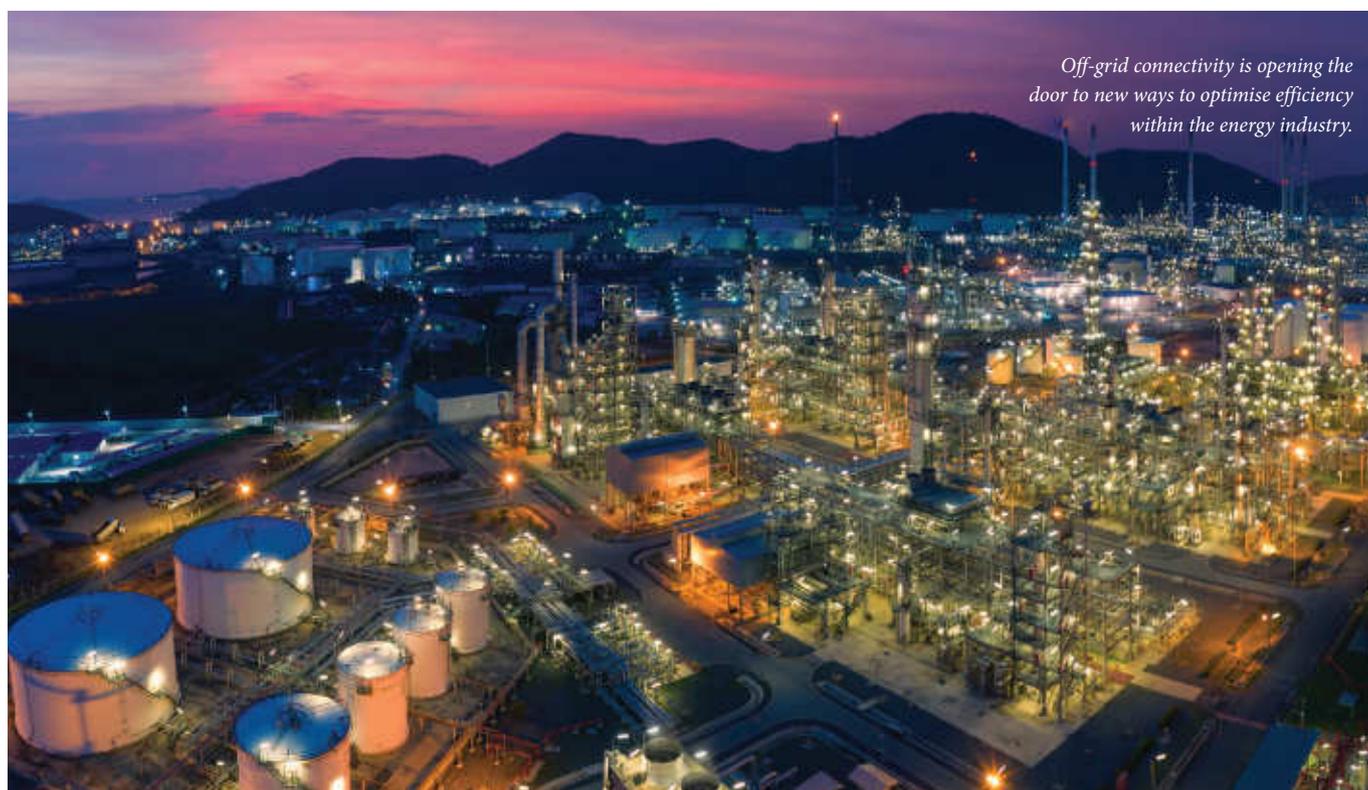
“This would not only result in development and growth of hydrocarbon sector in the country but would also give great fillip to other ancillary industries in Nigeria resulting in employment generation opportunities, development of local talent, supplies and contactors in this sector.”

“Dangote refinery project is the most prestigious project for Engineers India Limited. This is the largest grassroot refinery project for which EIL is providing its services in International territories. The successful execution of this project would add tremendous credentials to EIL’s track record and would be great testimony to its Technical, Engineering and Project Management prowess. The project would also reaffirm EIL’s credentials and position as one of the premium consultancy organisation across the hydrocarbon value chain in International markets,” EIL further added. 🔴

“ This refinery project is underlining the long-term growth perspective Nigeria and the region of West Africa have. It will enable the country of Nigeria as Africa’s biggest crude oil producer to raise its processing capacities.”

A DIGITAL FUTURE FOR ENERGY IN AFRICA

Production costs within the oil and gas sectors alone could decrease by between 10% and 20% through the use of sensors and tracking systems. Mike Crook, vice-president energy sales, Speedcast, discusses how off-grid connectivity is opening the door to new ways to optimise efficiency within the energy industry.



DIGITAL CONNECTIVITY HAS become a fundamental component of modern life, whether for business, entertainment or the operation of complex industrial machinery.

The energy industry is no exception, and continues to implement Internet of Things (IoT) technologies around the world, with an ever increasing need for fast, reliable connectivity as the foundation which these

new technologies are built upon.

By 2025, the global number of Industrial IoT (IIoT) connections is expected to double to 36 billion, as operators look to reap

the benefits that digitalisation can bring. Reaching that number will require a mix of on-grid (terrestrial wired or cable) and off-grid connections, like those

“ Production costs within the oil and gas sectors alone could decrease by between 10% and 20% through the use of sensors and tracking systems.”

being deployed in the Rovuma Basin in Mozambique, where economy-changing volumes of natural gas have been found. With oil and gas exploration typically taking place in regions with minimal existing infrastructure, there is a need for deployment and management of innovative connectivity solutions. These must not only support Pioneer and Early Phase developments, but must also be able to support ongoing

connectivity for these remote operations once they go into production. This continues to be the case in Mozambique. Investments in IT and telecommunication systems there are already helping to streamline and modernise operations.

Transformative technology

Off-grid connectivity is opening the door to new ways to optimise efficiency within the energy industry. Production costs within the oil and gas sectors alone could decrease by between 10% and 20% through the use of sensors and tracking systems, which are being utilized in large-scale construction projects, such as those found in Mozambique. Additional uses for IoT include equipment that provides telemetric data, which operators can use to predict when maintenance is required, or whether temperature settings onsite require adjustment. On-grid, sensors can also be used to review the state of transmission and distribution lines at various intervals within the networks, which help to manage the electrical grid on an automated, real-time basis. Analyzing all this data and using it to guide operations improves uptime, reduces maintenance costs, makes supply chains more predictable, boosts employee productivity and makes energy distribution more cost-effective.

Connected vehicle and asset tracking systems are also being used to increase safety and security for personnel. This includes features that can trigger alarms should any vehicle differ from its usual routes. Traditional security measures are being upgraded through the use of intrusion detection, CCTV, access control and other technologies, all of which lessen the risk to workers onsite. Videoconferencing allows operators to communicate with other facilities seamlessly,



Image Credit: Speedcast

Mike Crook is the vice-president energy sales, Speedcast.

ensuring reliable lines of communication for site operations no matter how remote the location. In these off-grid applications, satellite provides the essential long-haul, multi-megabit connectivity, from high-throughput satellites in GEO orbit to the new generation of medium earth orbit (MEO) spacecraft.

A connected workforce

Enhanced remote connectivity is not only about streamlining industry operations but about improving the quality of life for staff. Engineers and operators who previously would have been required to physically travel to a site are now able to provide their services through the use of voice and video applications, without

ever having to leave their office. Tasks which may have taken days to resolve can now be worked through within minutes, decreasing overall downtime. This has also reduced costs for operators, lessening the need for transportation and living costs.

Regulations and an uncertain economy in Mozambique have slowed down the major operators' ability to bring in skilled employees and experts for both short and long-term work. When the nation was placed in a state of emergency due to the pandemic in March 2020, it reduced the number of onsite employees to one third of the normal capacity, and ensured a 1.5 metre distance was kept between workers. Adequate connectivity became vital for the continuation of

operations. Remote access applications provided companies with a pathway to continue working effectively by maintaining a connected workforce, despite the staffing challenges.

Personnel were also able to access a variety of real-time entertainment and communication services. The ability to speak with loved ones, stream movies, play games and access social media has helped to keep morale high despite the circumstances.

Powering the future

Oil and gas sites in Mozambique have become a testament to the possibilities of IoT equipment and connectivity at remote locations. Innovative advancements in digital technologies are making operations more automated and more efficient, while increasing the quality of life for staff needed on and off site. With the global value of IoT continuing to grow at a rapid pace, the potential of such technology to further enhance and optimise the energy operations appears limitless. Digitalisation is paving the way towards a more streamlined future for energy operators in Africa and worldwide.

Speedcast is a leading communications and IT services provider, delivering critical communications services to the Maritime, Energy, Mining, Media, Telecom, Cruise, NGO, Government, and Enterprise sectors. The company leverages its global network platform to provide fully connected systems that harness technologies and applications to transform what remote operations can achieve. Speedcast enables faster, seamless pole-to-pole coverage from a global hybrid satellite, fiber, cellular, microwave, MPLS and IP transport network with direct access to public cloud platforms. ♦

www.speedcast.com

“Enhanced remote connectivity is not only about streamlining industry operations but about improving the quality of life for staff.”

INDUCTION BENDING FOR SOUTH AFRICAN INDUSTRIES

With a focus on safety and quality, backed by international expertise, Steinmüller Africa aims to emerge as the fabricator of choice for South Africa's power, paper and petrochemical companies.

C OJAFEX PB 850 induction bending machine from Steinmüller Africa is providing induction bending solutions to the South African market.

The machine is one of only two induction bending machines on the African continent, enabling paper and pulp, power, petrochemical and mining plants to source custom bends locally, as well as large radius, multiple or complex bends – all with quick turnaround times.

Induction bending is the process whereby a straight pipe is precision-bent by a specially-engineered machine. The front of the pipe protrudes through an induction coil and is clamped into position. The induction coil is heated to a specified temperature and then the arm of the machine moves in a predetermined radius, pushing the pipe through the coil. "This is programmed into the machine upfront and is an automated

“ Induction bending is the process whereby a straight pipe is precision-bent by a specially-engineered machine.”



HP Heater Tube bundle final fitments before the shell goes over.

process," explained Lee Chapman, divisional manager – piping, Steinmüller Africa.

The automation and machine control renders a precise and top-quality pipe bend. "Our Cojafex machine is capable of bending pipes between 48.3 OD and 850 OD with a wall thickness up to 100 mm. It can

create bends up to 180 degrees," added Chapman.

Induction bending is ideal "when standard size bends are not available and custom or large radius bends are required," stated Chapman. Since it can create complex (multiple) bends without the need for welding, induction bending guarantees

pipe system integrity and a reduced maintenance requirement, making it especially well-suited to high pressure (HP) piping, steam piping and industrial piping systems. This also means it delivers a relatively low cost of ownership. In addition, if multiple bends are done at once then there is a cost saving during the erection and ongoing maintenance phases of a plant's operation.

The benefit of partnering with Steinmüller is that it offers complementary services in addition to induction bending. "There is no need to move the component between different suppliers as we are able to do all the necessary bending, welding and heat treatment in-house," commented Chapman.

Using its Schlager gas furnace, Steinmüller conducts post bend heat treatment (PBHT), which ensures the pipe's mechanical properties are restored following the bending process. In addition, Steinmüller specialises in various welding processes, enabling custom welding onto pipes.

"Steinmüller has been carrying out induction bending for over ten years at its facility in Pretoria and has a number of qualified bending procedures to both EN and ASME standards for safety and quality. Our in-house quality management system ensures that our products meet all the necessary international standards," added Chapman. ♦



The automation and machine control renders a precise and top-quality pipe bend.

IS AFRICA FINDING THE RIGHT MIX TO DRIVE ECONOMIC PROSPERITY?

There is a saying; 'oil and water don't mix'. While that may be true on a meta-physical level, it isn't true when it comes to Africa's energy needs. Explains Patrick Conroy and Mark Venables on behalf of Hyve Group.

AS THE POPULATION of the continent is expected to double by 2100, this creates a daunting energy challenge, combined with rising expectations of improved resilience and sustainability. Finding a sustainable way to meet growing energy needs is one of the core development challenges.

While Africa is rich in renewable energy sources it must also lift nearly half-a-billion people out of poverty according to the United Nations. These, and other challenges will come under the spotlight when heads of state, business leaders, energy experts and investors meet at African Oil Week and the Green Energy Africa Summit in Cape Town, October 3rd – 7th this year.

Here decisions on the right energy mix will have far reaching consequences. Endowed with both hydrocarbons and substantial renewable energy resources, Africa can adopt innovative, sustainable technologies and play a leading role in global action to shape a sustainable energy future. In addition to AOW the Green Energy Africa Summit will take place at the same time and same venue.

"As organisers of the event we realise that Africa needs energy solutions which vary from traditional oil and gas to renewable," said Paul Sinclair, vice-president for energy at Africa Oil Week (AOW), to be held from 3-7 October in Cape Town.

Supporting a renewable future for Africa

Accelerated deployment of renewables creates jobs and brings health benefits. The renewable energy sector today employs 10.3 million people worldwide. With far-sighted industrial policies and targeted skills development, millions of new jobs can be created in Africa. Doubling the share of renewables by 2030 would create additional economic value by

increasing global gross domestic product by up to 1.1%. This would signify a 3.7% improvement in global welfare and jobs for over 24 million people in the renewable energy sector. This would enable further economic benefits such as improved healthcare services, especially in the most remote areas.

Supply unreliability is a concern holding back economic development, with most countries facing frequent blackouts.

According to the 'Scaling Up Renewable Energy Deployment in Africa' report from the International Renewable Energy Agency (IRENA), Africa could meet nearly a quarter of its energy needs from indigenous and clean renewable energy by 2030. Modern renewables amounting to 310 GW could provide half the continent's total electricity generation capacity. This corresponds to a sevenfold increase from the capacity currently available, which amounted to 42 GW. A transformation of this scale in Africa's energy sector would require an average annual investment of \$70 billion to 2030, resulting in carbon-dioxide emissions reductions of up to 310 mega tonnes per annum.

Meanwhile hydrocarbons will continue to supply the remainder of Africa's energy needs until such a time that green energy forms the basis of the continent's power demands. Of course, carbon-based fuels are increasingly undesirable. However, it must be remembered that Africa produces less than 3.8% of the planet's greenhouse gases. When it comes to climate change Africa has the smallest footprint globally.

According to the late global health expert and statistician, Hans Rosling, the richest billion people contribute to over half of all CO2 emissions. This puts the responsibility for reduced carbon emissions squarely in the court of developed countries.

Signs of hope

In West Africa, the new Regional Electricity Access and Battery-Energy Storage Technologies (BEST) Project, supported with US\$465mn from the World Bank Group, will increase grid connections in fragile areas of the Sahel, build the capacity of the Economic Community of West Africa States (ECOWAS) Regional Electricity Regulatory Authority (ERERA), and strengthen the West Africa Power Pool's (WAPP) network operation with battery-energy storage technologies infrastructure. This is a pioneering move that makes way for increased renewable energy generation, transmission, and investment across the region.

Over the past decade, the World Bank has financed close to US\$2.3bn of investments in infrastructure and reforms in support of WAPP, considered the key to achieving universal access to electricity by 2030 in the 15 ECOWAS countries. This new project builds on progress and will finance civil works to accelerate access in Mauritania, Niger and Senegal.

Last year, the World Bank approved a US\$500mn International Development Association (IDA) credit to support Ethiopia's goal of achieving universal electricity access by 2025. Over the past decade, the Government of Ethiopia has made encouraging progress on its electrification program and expanded the grid network coverage to nearly 60% of towns and villages. Despite this progress, Ethiopia has the third largest energy access deficit in Sub-Saharan Africa with more than half the population still without access to reliable electricity, especially in deep-rural areas which are dependent on biomass and kerosene. The electricity deficit in Ethiopia continues to exacerbate the poverty situation, preventing far too many people from fulfilling their basic socio-economic needs and limiting access to opportunity. ♦

AFRICAN RIG COUNT

COUNTRY	Feb 2021	Mar 2021	Feb 2022	Mar 2022
ALGERIA	22	25	26	30
ANGOLA	4	4	6	6
CAMEROON	1	1	3	3
CHAD	3	3	3	3
CONGO	0	0	1	1
CÔTE D'IVOIRE	0	0	1	1
EQUATORIAL GUINEA	0	0	1	1
GHANA	0	0	1	1
KENYA	3	3	5	5
LIBYA	12	12	15	15
MAURITANIA	0	0	0	0
MOROCCO	0	0	0	0
MOZAMBIQUE	1	1	0	0
NIGERIA	7	6	8	10

Source: Baker Hughes

Halliburton launches new deep azimuthal resistivity service

HALLIBURTON HAS INTRODUCED StrataStar, a deep azimuthal resistivity service that provides multilayer visualisation to maximise well contact with the reservoir and improve real-time reserves evaluation.

The StrataStar service is the latest addition to Halliburton's iStar intelligent drilling and logging platform, which combines deep subsurface insights with artificial intelligence for improved drilling performance and consistent well delivery. For more decisive well placement, the StrataStar service acquires real-time measurement and visualisation of surrounding geology and fluids up to 30 feet around the wellbore.

It applies a sophisticated algorithm to accurately map the position, thickness and resistivity of interbedded rock and fluid layers to stay within targeted boundaries.

"Beyond its superior depth of investigation, StrataStar is different from other azimuthal resistivity technologies due to its ability to

StrataStar provides multilayer visualisation to maximise well contact with the reservoir and improve real-time reserves evaluation.



deliver a high-fidelity picture of the reservoir along with a comprehensive understanding of resistivity, including anisotropy," said Halliburton vice president of Sperry Drilling

Jim Collins. "This means faster, more accurate reservoir characterisation to precisely place wells in the most productive zones to maximise asset value."

Yokogawa and JSR use AI to control a chemical plant for 35 consecutive days

YOKOGAWA ELECTRIC CORPORATION and JSR Corporation have announced the successful conclusion of a field test in which AI was used to autonomously run a chemical plant for 35 days, a world first.

This test confirmed that reinforcement learning AI can be safely applied in an actual plant, and demonstrated that this technology can control operations that have been beyond the capabilities of existing control methods and have up to now necessitated the manual operation of control valves based on the judgements of plant personnel.

The initiative described here was selected for the 2020 Projects for the Promotion of Advanced Industrial Safety subsidy program of the Japanese Ministry of Economy, Trade and Industry.

Control in the process industries spans a broad range of fields, from oil refining and petrochemicals to high-performance chemicals, fiber, steel, pharmaceuticals, foodstuffs and water. All of these entail chemical reactions and other elements that require an extremely high level of reliability.

In this field test, the AI solution successfully dealt with the complex conditions needed to ensure product quality and maintain liquids in the distillation column at an appropriate level while making maximum possible use of waste heat as a heat source.

Fish-like autonomous underwater robot developed

VERLUME, A LEADER in intelligent energy management and storage technologies for the energy industry, has joined with consortium partners to progress the development of an autonomous underwater robot that moves like a fish.

The agile biomimetic autonomous underwater vehicle (AUV), named RoboFish, is made up of several self-contained modules with self-managed battery and actuator control for full-body, autonomous movement around underwater structures, enabling efficient offshore inspections in harsh and hard-to-reach environments. RoboFish was initially devised by researchers at the University of York, Department of Electrical Engineering and the University of Strathclyde, Department of Naval

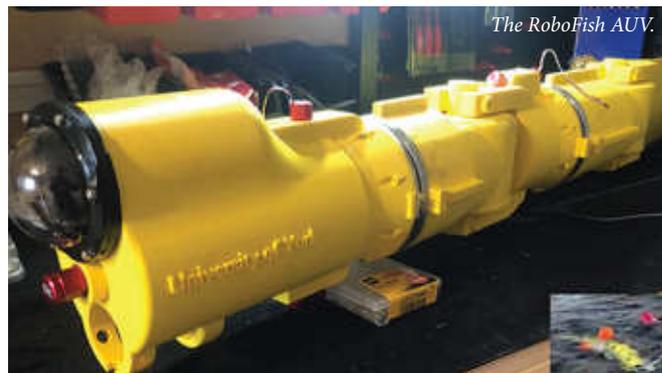


Image Credit: Verlume

Architecture, Ocean & Marine Engineering with grant support from the EPSRC Supergen Offshore Renewable Energy Hub.

With the limited accessibility, manoeuvrability and environmental impact of remotely operated vehicles (ROVs) and some larger AUVs, inspection of structures in the underwater environment is complex,

expensive, and reliant on human input. As the number of offshore structures is set to increase significantly with rapid growth in the offshore wind sector, robotic offshore inspections in harsh environments will need to become less reliant on human input and be more cost effective as compared to traditional inspections.

New methodology launched for measuring GHG intensity of crude oil

A COMPREHENSIVE NEW study by S&P Global provides new guidance and methodology that improves comparability, consistency and confidence in assessing the life-cycle

greenhouse gas (GHG) intensity of crude oil.

The study, entitled The Right Measure builds on existing literature, standards and practices to address some of the unique

challenges that currently limit utility of life-cycle GHG emissions estimates of crude oil. It also proposes a new “Data Quality Metric” – a framework to improve the transparency around the reliability of estimates – developed in collaboration with the U.S. Department of Energy’s National Energy Technology Laboratory.

The study includes a demonstration of the new guidance and methodology by creating a benchmark representing the average intensity of crude oil consumed in North America. The results assess the crude oil pathways that comprise more than 90% of the volume processed in the United States in 2019 and represents the most current and comprehensive assessment to date.



Image Credit: Adobe Stock

The new study improves the assessment of the life-cycle greenhouse gas (GHG) intensity of crude oil.

Dropsafe launches expanded Helideck Safety Net range

IN RESPONSE TO increased industry demand from the energy, marine and healthcare sectors, Dropsafe has expanded its Helideck Perimeter Safety Net range. Dropsafe now offers two different versions of the net, ensuring that all facilities can access a tailored safety solution according to their budget, location and facility requirements. The stainless-steel Helideck Perimeter Safety Net system attaches to the perimeter frames of helidecks to protect personnel or objects from falling.

Mike Rice, Dropsafe commercial director, commented, "From harsh offshore environments to hospitals, helidecks are critical entry points where safety is paramount – and extended



Dropsafe Helideck Perimeter Safety Net System.

periods of downtime are unacceptable. This has driven growing demand as activity ramps up across multiple sectors, leading rig managers to push for cost-effective solutions to mitigate safety risks around the helideck, such as Drops or Man Overboard incidents."

The 316 stainless-steel Helideck Perimeter Safety Net system attaches to the perimeter frames of helidecks to protect

personnel from falling. The system is designed to withstand an impact greater than 2.3 kJ (100kg at 2.35 metres), exceeding global helideck standards. Dropsafe also scrutinised prevailing testing practices for helideck nets. With increasing industry recognition for safer, non-destructive alternatives, Dropsafe is looking to create a new testing option in line with operator requirements.

Lloyd's Register announces AllAssets 3.0

LR SOFTWARE, PART of Lloyd's Register, has announced that its AllAssets asset performance and management software rolled out on more than 90,000 assets across 125 sites last year, drastically increasing its global market share.

AllAssets allows businesses to quantify their risk exposure and prescribe the most effective inspection and maintenance plans dramatically reduction

unplanned downtime. The cloud-based software has been customers reduce risk of failure by up to 95% and, with safety and integration in mind, aims to eliminate data siloes and increase asset performance while optimising inspection costs across assets.

AllAssets 3.0 is the latest major update to the solution, due to roll out to customers in March

2022. The software has seen significant updates and additions, all in the name of improving customer experience and enhancing asset performance management capabilities by providing its users with all their data at their fingertips.

Glyn Rhodes, vice-president product for APRM, LR Software, said, "We work really closely with our customers to ensure that we're integrating and implementing their feedback, so that we can be certain that we are providing solutions that not only reduce risk and improve operational efficiencies, but that allow them to achieve their business goals. AllAssets 3.0 is a culmination of our industry knowledge and expertise, but also a collaboration with our customers.



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Unity launches a new range of compact well integrity technologies

ABERDEEN-HEADQUARTERED UNITY, EUROPE'S largest provider of well integrity solutions, has launched a new range of compact technologies to solve common industry challenges including working space, component weight and personnel on board (POB) restrictions. The technologies will be used to support Unity's surface well integrity, shallow intervention and well decommissioning services.

For offshore operations, the new products reduce well bay space requirements, simplify and accelerate offline mobilisation and reduce POB, cost and risk. Due to these efficiencies, the products all offer between 50-75% savings in OPEX.

The new technology range includes a compact dual-bore xmas tree isolation system, a compact valve removal tool and a compact shear-seal valve. The products complement Unity's existing Surface Intervention System (SIS), the first product in this compact technology range, which is already delivering multi-functional operations, such as inspection, plug setting, milling and xmas tree removal, at reduced cost and improved efficiency compared to wireline or coiled tubing intervention. The SIS is the most compact of its type on the market with a footprint of around 2ft², requiring only two technicians to operate. It delivers savings in the region of 60-75% for a single deployment.

GDEP launches new timesaving SafeLock valve cover lock for drilling modules

GD ENERGY PRODUCTS (GDEP), the leading total solutions provider for the drilling, well servicing and frac pumps market, has launched SafeLock, a hammerless quarter-turn valve cover lock for drilling modules.

SafeLock delivers safer and faster removals, without requiring any tools and are durable and hammerless. SafeLock eliminates safety hazards and increases operational efficiency by reducing the multiple revolutions needed to remove the valve cover lock to a simple quarter-turn. Corrosion resistant threading and grease zerks keep threads lubricated between service intervals. A robust handle design increases leverage and ergonomics.

Ryan Huseman, lead engineer, GDEP,

said, "SafeLock's mechanical lock design requires no preload and eradicates the need for hydraulic pumps, torque wrenches, drills and impact guns. With SafeLock, we have essentially converted a dangerous multi-minute process to a tool-less and hazard-free 10 seconds."

SafeLock has been field tested by a leading U.S.-based drilling contractor on rigs located in West Texas and Oklahoma. It is also backed by the completion of a Highly Accelerated Load Test (HALT), which successfully tested to 2 million cycles at over 12,000 PSI. SafeLock will be offered as an optional upgrade on new GDEP drilling pumps and modules and is also applicable for retrofit on GDEP HD, F and Y series drilling pump modules with bore seal technology.



Image Credit: GDEP

SafeLock eliminates safety hazards and increases operational efficiency.

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VAALCO Energy to support subsea reconfiguration and FSO deployment in Gabon

VAALCO ENERGY HAS partnered with DOF Subsea to perform subsea construction and installation services to support the subsea reconfiguration associated with the replacement of the existing floating production, storage and offloading unit (FPSO) with a floating storage and offloading vessel (FSO) at the Etame field, offshore Gabon.

DOF Subsea will provide all personnel, crew and equipment necessary to assist with reconfiguring the Etame field subsea infrastructure to flow field production to the replacement FSO. Engineering and design work in relation to the field infrastructure upgrade has been completed with subsea work planned to commence in July and be completed before the FSO is operational in September 2022, as previously disclosed.

ADVERTISER'S INDEX

Eko Signature	36
Frigmaires Engineers	19
Liugong Dressta Machinery Sp. z o.o.	2
Oman Cement Company	7

FACILITATING THE ENGINE OF GROWTH: WOMEN IN ENERGY

According to a recent study conducted by McKinsey, in Africa and the Middle East, women make up just 9% of senior management positions in the energy sector, with less than 8% in the oil and gas technical space. However, the situation is slowly improving, and the role of women is gradually gaining some recognition in Africa's energy sector. Grace Orife, CEO of Adelaar Energy, has shed some light on this development. Deblina Roy reports.

TRADITIONALLY, OIL AND gas was considered to be a physically intense industry which resulted in it being male-dominated for years, with a small percentage of women considering a career within the sector. The last decade has seen a shift in participation by women across all levels in the energy space. Although the gap is still visible among the workforce today, the efforts have resulted in more women actively taking on roles such as technical specialists, line management and CEOs/MDs of top oil and gas companies i.e. IOCs, NOCs and Independent Energy operators in Africa.

One of the primary inhibitors to active female participation within the industry is the fact that women simply did not see any light at the end of the tunnel and essentially "stayed away", specifically in the fields of Science, Technology, Engineering and Math (STEM). That however is not entirely the case today, as there is an ongoing wave of reforms in energy policies across Africa that creates more opportunities for women to participate and contribute to the industry. There has been some investment in STEM education - specifically, programs to provide access to finance for women in energy as part of the diversity and inclusion programs of some private entities and NGOs. For instance, Nigeria in promoting its local content has included some incentives to support women in the energy industry via the National Content Development and Monitoring Board (NCDMB) and Nexim Nigerian Export-Import Bank to support diversity and promote women-participation in the oil and gas industry. Yes, there are actions made towards inclusion and diversity, however the progress has not been as expected.



Grace Orife is the CEO of Adelaar Energy.

Women on their part have intensified efforts on mentoring, development and networking to support their growth in the industry. To this end they have formed and founded common-interest networks at national and subnational levels which provide platforms for growth and build links to support their careers and businesses.

The next logical step would be to achieve the same at the Pan Africa level with the aim to propel the Africa continent. The Africa Women in Energy Network (AWIEN) is one of the initiative driven by Team Energy Africa

(TEA) borne of a partnership between United Nations Economic Commission for Africa (UNECA), African Energy Chamber (AEC) and Sustainable Energy for All (SEforALL). The TEA initiative centers on three overarching pillars – sustainability, governance and finance. In supporting countries that embrace sustainability and address key governance challenges to unlock private sector clean energy investment, TEA is committed to unlocking critical capital needed, promoting an investment friendly Africa and steering energy access and growth as Africa journeys through Energy Transition.

AWIEN would provide an umbrella body to facilitate collaboration amongst women in energy across Africa, creating a platform for women to network, as well as collaborate towards investing in the industry and developing core skills and capabilities, whilst offering opportunities for coaching and mentoring.

Another notable initiative is the 'AEW 2022' and 'Women in Green Hydrogen', both of which aim to increase the participation of women in shaping the energy events. Backed by this partnership, women will represent at least 30% of participants and speakers on panels at AEW and other AEC events.

African governments need to continuously identify and facilitate the need to motivate women across the industries to pursue technically-inclined disciplines, which will in turn upskill and expose them to better opportunities in the energy industry.

In conclusion, commitment and collaboration among the African countries are vital to facilitate these initiatives, and a good gender mix would be a vital driver for an effective Africa Energy Transition. 🔥

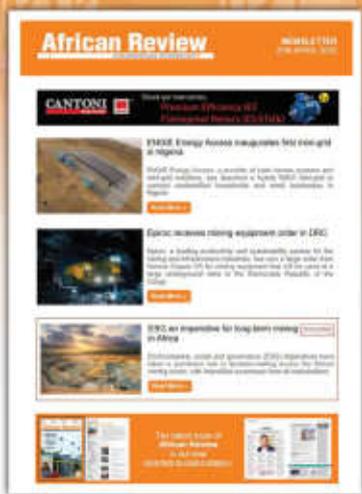
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