

# African Review

July 2015

of BUSINESS and TECHNOLOGY

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**Power:**  
Generators fill the power  
P42

**Mining:**  
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coloured gemstones P80



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# African Review

of BUSINESS and TECHNOLOGY

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Commercial extraction of  
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# Editor's Note

This issue of African Review offers insights into railway infrastructure development in Ghana and the insurance industry in Botswana, and analysis of private equity investment in agricultural business. There are, also, fresh appraisals of investment and banking. Commercial, financial and economic matters are covered between pages 20 and 30, addressing specific developments in Ghana and South Africa, as well as broader pan-African concerns. From page 34 to page 37, this issue addresses matters affecting transport and material handling, with particular respect to sea freight between Asia and West Africa, and to warehousing solutions. Page 38 to page 60 represent the power sector, with a focus on generators, and articles on combined heat and power and on concentrated solar power. From page 62 to page 83, this issue covers developments in construction and mining, offering insights into the use of concrete, and of formwork, and also the construction of housing, facilities and roads. The latest excavators are reviewed, too. The features section of this magazine concludes, then, with analysis of mining for gems and precious metals, chutes systems and pumps.

Andrew Croft, Editor

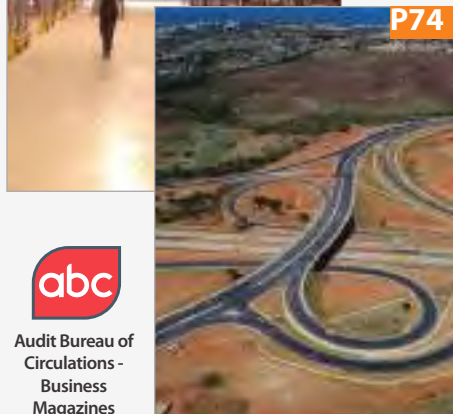


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# Agenda / North

## Djezzy mobile network now available on Algiers Metro

Algerian mobile telephony firm **Djezzy** has launched its GSM and 3G network in the Algiers Metro. A ceremony marking the launch took place recently at the Grande Poste Metro station, attended by Algerian Minister for Transport Boudjema Talai, Wali of Algiers Abdelkader Zoukh, **Enterprise Metro Algiers** CEO Aomar Hadbi, and **RATP El Djazair** general manager M Lescoupe. The event also welcomed representatives from Algeria's Ministry of Post, IT and Communications. Watching videos, sending text messages, surfing the web or chatting to friends on social media is now possible across the whole metro network, thanks to the new facilities and advanced equipment introduced.



Djezzy has launched mobile communications on the Algiers Metro

Djezzy has formally thanked the Algiers Metro team for facilitating the implementation of the project and paid tribute to the technical teams who ensured the success of the initiative.

## Sarl Obi showcases Inmesol gensets at new facilities

**Sarl Obi**, the distribution company for **Inmesol** products in Algeria, has recently inaugurated its new offices and showroom in Algiers, the capital city. The change of location is due to the growth the company has experienced over the past few years; for which Inmesol has taken the opportunity to congratulate the firm. The new Sarl Obi headquarters are located near the Houari Boumediene International Airport, facilitating the company's transport and communications, with a spacious showroom on the ground floor, which includes a large area dedicated to Inmesol generator sets.

Sarl Obi supplies equipment to the industrial and construction sectors. Founded in 2005, the company was a pioneer in promoting the culture of risk prevention among the main Algerian companies and multinationals based in the country. Likewise, the company's vision has led it to commit to quality when creating alliances with partners and international suppliers, enabling them to respond to the growing demand for quality products and services in the Algerian market.

With the aim of having a large stock available, at the end of 2014 Sarl Obi placed



an order for a considerable number of generator sets, which Inmesol is sending in monthly deliveries. The order includes several soundproof models from the emergency range, with powers ranging from 20 to 1,000kVA. Its gensets come in open versions or soundproof casing, with powers ranging from 2 to 2,500kVA: mobile, industrial, stand-by, heavy and rental.

Sarl Obi offers clients a combination of expertise and experience, advising them and providing technical support during all the phases of the projects. As Inmesol generator set distributors with a sound knowledge of the product, they can make

recommendations on which gensets will best meet your energy supply needs before installing and putting the equipment into operation for you. Not only that, but they provide an efficient post-sales service thanks to their team of qualified technicians.

*Contact Details for Sarl Obi:*

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# Agenda / East

## Park Hyatt's place in Zanzibar

Zanzibar is now an established destination for **Park Hyatt**, whose first hotel on the island represents both the intimate and understated elegance of the Park Hyatt brand and the rich culture, heritage and historical significance of the location. Park Hyatt Zanzibar sits on the beachfront in Stone Town, the historical centre of the city. Park Hyatt Zanzibar is housed in two buildings, one of them Mambo



Park Hyatt Zanzibar represents the rich culture, heritage and historical significance of the island

Msiige, a UNESCO heritage building, steeped in history, grace and mystique with roots dating back to the 17th century. Mambo Msiige is a typical Zanzibari mansion and an architectural gem, featuring intricate carvings and centred around a peaceful courtyard. The new and purposefully built Zamani Residence of the hotel connects to Mambo Msiige, blending old history and contemporary charm with architecture that embraces Swahili culture with a blend of Arab, Persian, Indian and European elements.

## SunGard's new Kenyan base

Financial software company **SunGard** has office in Nairobi, Kenya. By investing in a physical presence in Kenya, widely regarded as the financial services hub for East Africa, SunGard reinforces its commitment to the region and is well-positioned to execute on its strategy of achieving accelerated growth.

SunGard's Nairobi office provides its existing customers in Kenya, Tanzania and Uganda with professional services, training and project support, and functions as a base to expand and service new customers in the broader East African region. With existing offices in Cape Town, Johannesburg and Tunis, Nairobi will mark SunGard's fourth

regional operating office in Africa.

SunGard currently supports over 140 customers in Africa, which include banks, securities firms, hedge funds, pension funds, asset managers, energy and commodity trading firms, insurance companies, corporations and government entities in 15 African countries. Fred Manthe, managing director East Africa for SunGard, said, "As we focus on the region's positive economic growth and expanding client network, we are very excited about our strategic investment in East Africa and look forward to offering our customers a more efficient, competitive and industry aligned solutions and service."

## Prospects for East African banks

**Renaissance Capital** recently hosted **Kenya Commercial Bank**, **Equity Bank** and **Bank of Kigali** management teams at its 6th Annual Pan-Africa 1:1 Investor Conference. Margin pressure was a key topic. Pressure on Kenya Commercial Bank's margin YtD has been driven by stronger growth in its corporate loan book, where FX lending has been picking up, and some pressure from funding costs. To offset this, management plans to grow its SME and consumer loans quicker. Equity Bank's margins are under pressure but the bank is attempting to offset this via NIR. The key driver of the fall is continued growth in the SME book, where one-quarter of lending is in FX. With respect to Bank of Kigali, the National Bank of Rwanda appears to have put in place measures that are stifling access to FX, with a view to keeping the exchange rate stable. This is hurting Bank of Kigali's NIR, according to management, but it expects to replace this by growing the loan book and driving transactional banking income.

## Iron ore reserves worth US\$15.6bn found in south western Uganda

**Uganda's Ministry of Energy and Mineral Development** has confirmed that, following airborne geophysical surveys, it has been able to focus investors in the mineral sector on targeting and quantifying commercial mineral deposits and new iron ore reserves in south western Uganda, which are estimated at 116mn t with a gross value of US\$15.6bn. In latest review of the country's mineral sector, the Ministry indicated that the new ore reserves were discovered at Buhara (48mn t), Nangara (6mn t), and Rugando (55mn t). It reported, "Over 200mn t of iron ores are now proven to exist in the region," and added that vermiculite reserves have also increased from 5mn t to 54.9mn t at Namekhara in eastern Uganda, while the country's limestone/marble reserves have increased from the known 30mn t to over 300mn t after quantifying reserves in Karamoja, in north eastern Uganda.

### New iron ore reserves have been discovered at Buhara, Nangara, and Rugando

The review indicates that a total of 7.8mn oz of gold have been proven in Busia, eastern Uganda (500,000t), Kamalenge in Mubende (5mn oz), Mashonga in western Uganda (1mn oz), Kampano in western Uganda (500,000oz) and Alupe in Busia (800,000oz). In sum, reserves indicated bear an estimated gross value of US\$11.5bn.

Areas undergoing further appraisal include the Kilembe mines and Sukulu Phosphates projects. Kilembe mines developer has re-established the reserves at 4,527mn t of ore with a grade of 1.598 per cent copper and production is expected to begin at the end of 2016.

*Geoffrey Muleme*



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# Agenda / South

## Cummins motivator restored to power Botswana pit



The Cummins motivator on a Western Star 6900 XD truck, powered by a Cummins ISX engine

Maintenance and repair work has been successfully completed on a 2MVA **Cummins** motivator, which provides standby power solutions to a large-scale **Bucyrus 495** electric rope shovel, located at the Debswana Jwaneng open pit diamond mine in Botswana.

The Cummins motivator is a containerised diesel generator powered by a Cummins C2250 D5, 6.6kV generator set with a QSK60 engine, enclosed in a customised container, which houses medium-voltage switchgear, a medium-voltage transformer and a 10,000ℓ diesel tank.

The switchgear is provided with FM200 gaseous fire protection, while powder-based fire protection is provided for the engine room. The generator set is controlled by a Cummins PowerCommand PCC 3200 controller. The whole container is mounted on a custom-built, 55-ton **Martin** trailer, pulled by a **Western Star** 6900 XD truck, powered by a Cummins ISX engine.

The Bucyrus 495 extracts an impressive 100-tons-per-load, and the mine relies heavily on the Cummins motivator to power the electric rope shovel, as it eliminates the need for long, vulnerable power supply cable runs that require multiple cables linked by substations.

Cummins Southern Africa general manager for power systems Warrick Gibbens states that the motivator allows for more freedom of movement over a greater range, which streamlines the diamond-mining process. "As a result, motivator downtime must be proactively avoided at all costs."

Following years of exceptionally heavy-duty service, Gibbens indicated that the motivator experienced considerable wear-and-tear.

"The motivator is exposed to all the elements, which is damaging to components over a prolonged period. It had also experienced many bumps, with a cracked fuel tank and damaged panels," he said.

In order to get the motivator - which is no longer in warranty - into prime condition, Cummins worked closely with a number of partners and subcontractors to recondition the entire unit. Gibbens pointed out that this involved repainting the trailer and replacing all of its shocks.

"The fuel tank and 6.6kV switchgear were also entirely replaced, in addition to the neutral earthing resister, all fire systems, and the auxiliary generator. Cummins was responsible for designing and free-issuing the components, while our subcontractors completed installation. A good working relationship between all parties resulted in no major challenges being encountered," he said.

## TAP provides emergency rescue services in Mozambique

**T**rans-Africa Projects (TAP), Fluor's joint venture company with **ESKOM**, recently played a pivotal role in the emergency repair operations in Mozambique following floods caused by torrential rains earlier this year.



TAP has played a pivotal role in emergency repair operations following floods in Mozambique (Photo: Conrad Daffie)

More than 100 people were killed and 150 000 displaced after the floods, some of the heaviest on record, left the northern half of the country without power for five weeks. According to TAP's managing director, Barrie Badenhorst, the floods knocked down Mozambique's main national 220kV transmission line north of Qulemane-Mocuba. "Mozambique's power utility repaired the line with TAP's assistance. TAP assisted the operation by providing specialized helicopter services."

At least ten structures were damaged and had to be repaired. It was however impossible to reach the damaged towers by road as the 600m wide river was still flooded. A helicopter was used to put up a pilot rope line over the river to string the conductor. The damaged towers were replaced by temporary wooden structures.

The operation was challenging as there was no access to roads and all personnel, equipment and materials had to be flown in by helicopter. This involved the transportation of heavy equipment (up to 1.3 tons) by helicopter, using the underslung method. This method made it possible to transport equipment and cargo via a net hooked to a sling which was attached to the bottom of the helicopter. TAP also assisted rescue teams.



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# Agenda / West

## Louis Berger supports major road modernisation in Guinea

Professional services corporation **Louis Berger** recently kicked off a 1.3mn euro (US\$1.4mn) construction supervision project to rehabilitate 151km of National Road 1 (RN1) between Dabola and Kouroussa in central Guinea. RN1 is a major thoroughfare across the country and could extend to southeastern Mali in the future.

"This contract is the result of our commitment to building a strong partnership with the Guinean Ministry of Public Works, which reflects our more than 25 years of experience in the country," said Pascal Houdeau, deputy general manager of operations for West and East Africa. "That commitment and experience in Guinea are behind our decision to maintain a presence in the country and continue work during the worst of the Ebola outbreak."

Financed by the National Development Budget, the project includes site clearance, earthwork, drainage and paving. RN1 rehabilitation is part of a national road network modernisation programme. The government aims to boost national and international commerce by connecting strategic transport axes and developing the country's transportation infrastructure.

In recognition of Louis Berger's experience in country, Alpha Condé, Guinea's president, recently named the firm "a strategic partner" for its contribution to the development and modernisation of the national road infrastructure. Louis Berger has more than 50 years of experience in Africa and more than 25 years of experience in Guinea, where the firm has implemented over 40 projects.

These projects cover a broad range of professional services in transport, mining, agriculture and economic and institutional development.



Guinean Minister Public Works Mohamed Traoré (left) and Louis Berger representative (right) laying foundation stone for Dabola-Kouroussa road

## DRC bank acquisition

Kenya's **Equity Bank Group** has acquired a 79 per cent stake in **ProCredit Bank** in the Democratic Republic of Congo (DRC) at a cost of US\$67mn. Established in 2005, ProCredit has net assets of US\$25mn and a customer base of 170,000, making it the seventh biggest in DRC. "Equity is now positioned for growth in this vast and resource rich country of 85mn with under four per cent of banking penetration," said James Mwangi, Equity Bank Group CEO.

Part of the US\$67mn will be used to double ProCredit's network to 30 branches. ProCredit holdings manager Helen Alexander said, "We are confident that Equity Group will offer excellent prospects for our clients, staff and most importantly for the DRC's economy. We have evaluated various bids and we feel Equity is the right strategic fit to support our development."

*Mwangi Mumbero*

## Biwater completes water treatment and supply projects across Ghana

Overcoming space limitations to build a new potable water treatment plant, and challenging terrain to lay extensive pipework, **Biwater** has delivered two projects spanning a number of distinct population centres across Ghana.

In Kpong, Southeast Ghana, Biwater recently completed the construction of a 41,000m<sup>3</sup>/day (41MLD) reinforced concrete direct filtration potable water treatment plant to serve Kpong and its environs, as well as rural communities between Kpong and Tema. The facility is supplied by a lake that is situated between the Akosombo and Akuse Dams on the Volta River.

From Aframsso to Kumawu in the Ashanti Region of Ghana, Biwater also completed an extensive pipeline installation project that involved the excavation, welding, laying, backfilling, testing and disinfection of over 50km of steel and HDPE transmission pipeline.

Excavation was carried out along challenging terrain that required breaking out hard rock to bury the pipeline, as well as some lengths above ground that were laid on pipe support plinths. Due to the hilly nature of the local topography, the scope of works included numerous road, stream and river crossings. Air valves, washout valves and isolation chamber valves were installed to ensure the continuity of flow along the route.

"The completion of these water treatment and supply projects would not have been possible without our skilled team locally. They handled the laying of extensive steel and HDPE pipes in steep and rocky terrain, whilst also successfully managing complex logistics to deliver robust and long-lasting solutions," said David Thorpe, Biwater managing director West Africa.

Prior to these projects, Biwater delivered the Tamale Water Supply Project in the North of Ghana and numerous other water related infrastructure projects across the length and breadth of the country.

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# Events / 2015

## August

10-11

### 100% Design South Africa

Johannesburg, South Africa  
[www.100percentdesign.co.za](http://www.100percentdesign.co.za)

20-23

### Kenya Building Week

Nairobi, Kenya  
[www.kenyabuildingweek.com](http://www.kenyabuildingweek.com)

22-24

### Buildafro

Dar Es Salaam, Tanzania  
[www.africanfairs.com](http://www.africanfairs.com)

27-28

### EAPIC

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## September

7-11

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9-10

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## Cavatorta makes high security fencing for Expo 2015

The Cavatorta Group has won the contract to supply the perimeter fence for Expo 2015 in Milan, Italy. Cavatorta has been manufacturing high security fencing panels for many years, supplying its domestic market in Italy as well as other countries around the world. The company's high security panel systems have been used on applications where security is a priority for instance airports, military zones, high-security areas at chemical or pharmaceutical sites and prisons.

The special features of these panels include large diameter wires and extremely small mesh openings, which prevents the use of wire cutters and makes it almost impossible to climb over, the use of special posts fitted with anti tamper safety bolts prevents the removal of panels increasing security even further.

Cavatorta's vast experience in this field



**Cavatorta's experience in manufacturing high security fencing panels has helped it to win the contract to supply all of the perimeter fencing for Expo 2015 in Milan**

has helped it to win the contract to supply all of the perimeter fencing for Expo 2015 in Milan - an international exhibition, which runs until 31 October.

The fence is about 6,000m in length, with individual panels of 2,520mm width. Heights vary between 1,500 and 3,000mm, according to requirements. The design of the panels feature 6mm diameter vertical wires and 4mm diameter horizontal wires. The anti-climb safety mesh measures 75x12mm with an open aperture of 69x8mm. The panels are mounted onto brick-faced plinths made from heavily reinforced concrete posts, fitted with a double anti-climbing cap and six rows of Cavatorta RICCIO PVC barbed wire offering an additional deterrent to anyone thinking of climbing the fence.

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# Bulletin / Investment

## EY reports more FDI from fewer projects

According to EY's 2015 Africa attractiveness survey, entitled 'Making choices' - Africa's 2014 share of foreign direct investment (FDI) projects fell 8.4 per cent, while foreign direct capital investment into the continent surged to US\$128bn, up 136 per cent, with the number of jobs created from FDI jumping 68 per cent resulting in 188,400 new positions across the continent; according to EY Africa CEO Ajen Sita, African economic growth is likely to be at its lowest in five years, dragged down by the impact of lower oil prices on the Nigerian and Angolan economies, the softening of other commodity prices, and South Africa's sluggish performance, but "sub-Saharan Africa will still experience the second highest economic growth rate in the world this year, with 22 economies growing at a rate of five per cent or higher".



## Imara and Oryx collaborate with Regent Botswana

Pan-African financial services group **Imara** and its **Oryx Finance** associate have confirmed that **Regent Life Botswana Limited** has taken an equity stake in their recently-launched Zambian small loans

business; Peter Edmonds, of Oryx Finance, commented, "The association with Regent Botswana considerably strengthens our new brand and will greatly assist us as we introduce our Money+ product, the gateway to granting affordable loans to thousands of Zambian civil servants and other quasi-government employees."

## Orange initiative encourages innovative start-up projects

Telecommunications operator **Orange** has launched a call for applications for the 5th edition of the Orange African Social Venture Prize; the initiative aims to encourage innovative start-up projects, which help to accelerate development on the African continent.

## Capacity development is critical to sustaining economic growth

Improving and enhancing Africa's capacity to formulate and implement sound economic policies and reforms aimed at creating a better business climate are key to prospects of economic growth and employment creation on the continent, said Beruk Negash, programme officer, East and Southern Africa, at the **African Capacity Building Foundation (ACBF)**, speaking on behalf of ACBF executive secretary Prof Emmanuel Nnadozie at the 12th Annual Forum of the Partnership for Development, held in Nairobi under the theme: 'Unlocking Africa's Growth for Productive Employment and Poverty Reduction'; Mr Negash said, "The Foundation has contributed to enhancing national capacity for policy formulation and implementation in most African countries through investing in human capital and institutions."

## Highlighting a 'holistic' approach to integration

Removing impediments to the movement of goods and people around Africa is critical for economies to develop, according to a panel

on the Future of Trade at the **World Economic Forum on Africa** in Cape Town, South Africa; the participants highlighted the fact that just 12 per cent of African countries' total trade is with each other and the continent only accounts for three per cent of value addition in global trade.

## Millicom agrees to acquire Zanzibar Telecom

Telecommunications and media company **Millicom** has signed a share purchase agreement to acquire an 85 per cent stake in **Zanzibar Telecom (Zantel)** from Etisalat Group; Zantel operates a mobile telecom network on the islands of Zanzibar with 2014 gross revenues of US\$82mn and 1.7mn subscribers across Zanzibar and mainland Tanzania.

## Ade Ayeyemi in as Ecobank Group's new CEO

**Ecobank Transnational Incorporated**, parent company of **Ecobank Group**, has appointed of Ade Ayeyemi as its new group chief executive officer, effective from 1 September 2015, replacing Albert Essien, who retires after 25 years of meritorious service with the group; Mr Ayeyemi said, "I am delighted to have been offered the opportunity to lead this great institution, and commend Albert Essien for his legacy work of helping further the premier pan-African financial institution.



Ade Ayeyemi leaves his role as CEO of Citigroup's sub-Saharan Africa division to become CEO of Ecobank Group





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# Bulletin / Power

## New Alfa Laval reactor means opportunities for small vessels

The proven capabilities of Alfa Laval PureBallast – which include operation in fresh, brackish or marine water and in low-clarity water with just 42 per cent UV transmittance – are now available to significantly smaller vessels; Alfa Laval's ballast water treatment technology can now be used in systems for flows of 87m<sup>3</sup>/h, as lower capacities are enabled by a new reactor, optimised for system sizes from 170m<sup>3</sup>/h down to 87m<sup>3</sup>/h - representing a major expansion of the PureBallast family, where a 250m<sup>3</sup>/h system was previously the smallest available.



The reactors are built with SMO steel for a long and corrosion-free life, and the power management is equally effective - See more at: <http://www.alfalaval.com/about-us/pressroom/articles/Pages/newreactorforalfalavalpureballast.aspx#sthash.3Vnswoze.dpu>

## Himoinsa and Yanmar form partnership

Generator set manufacturer **Himoinsa** has signed a consolidated operation agreement with diesel engine maker **Yanmar** to strengthen the market positions of both firms and to enable Himoinsa to add generator engines to its product line; Himoinsa president Francisco Gracia remarked that the relationship with Yanmar has been excellent since the two companies began collaborating in the genset business in 2006, and that this step is a logical evolution in their affiliation, adding, "Our distribution network will benefit from this agreement."

## SA Business backs plans as power crisis continues

South African enterprises are moving toward multi-faceted power plans as the nation's power crisis shows no sign of coming to an end in the foreseeable future, according to power sector experts on the **Power-Gen Africa Advisory Board**; Bertha Dlamini, managing director of **EON Consulting** and a member of the Power-Gen Africa Advisory Board, reported that EON's consultants had seen a significant increase in the number of local enterprises taking a multi-faceted approach to dealing with the power problem, saying, "Most enterprises cannot move completely off the grid, but they are installing backup power solutions such as generators for load shedding, and renewable energy solutions to supplement their power supplies."

## Battery life extender offers up to eight times more energy

A little known industry fact is that a typical disposable battery can have as much as 80 per cent of its energy remaining before an electronic device renders it useless; a game-changing technology that promises to extend the life and performance of a standard battery radically, in the form of a new product developed by Batteriser founder Bob Roohparvar, has a simple solution that promises to extend the performance of a seemingly 'powerless' battery by unlocking the hidden energy within - in the form of a patented sleeve, less than one millimeter thick, which slips onto a battery and draws out its remaining power, extending a battery's life by up to eight times.



New battery technology will both change and compliment traditional battery companies from a consumer, financial, and environmental standpoint

# Bulletin / Minerals

## Hummingbird produces Liberian gold with Aureus

With a gold inventory of 4.2Moz in Liberia, **Hummingbird Resources** has followed Aureus Mining's recent first gold pour in Liberia with development of the country's next gold mining project; Dugbe has a preliminary economic assessment in hand, demonstrating strong economics of developing a 20-year gold mining project.

## Kagem deploys biometrics for security at Lufwanyama emerald mine

A K1.2mn (US\$166,205) biometric system has been introduced at the **Kagem** emerald mine in Lufwanyama, Zambia, helping to tighten security, to minimise theft of the precious gemstones and thus increase turnover, enabling the company to boost



Zambia's Mines Minister Hon Christopher Yaluma tests the new biometric security at Kagem's emerald mine in Lufwanyama

profits and invest further in the development of the mine; the biometric system - the first of its kind in Zambia's gemstone sector - allows fingerprint recognition that will enable workers to

clock-in more efficiently, and control access to the various sections of the mine and processing facilities to ensure more widespread security throughout the premises.

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# African Review/On the Web

A selection of product innovations and recent service developments for African business  
Full information can be found on [www.africanreview.com](http://www.africanreview.com)

## Maersk to upgrade ports in Nigeria and Kenya

Shipping company A.P. Moeller-Maersk is expanding its operations in Africa, by seeking contracts to upgrade ports in Nigeria and Kenya.

Maersk is awaiting final sign-off on a contract to help build a new port in Badagry, located in Nigeria's southern Lagos state.

[www.africanreview.com/transport-a-logistics](http://www.africanreview.com/transport-a-logistics)



Maersk is seeking to expand its presence in Africa, by upgrading the Tema Port in Ghana and building new ports in Ghana and Nigeria (Photo: Max Herman)

## FDI values in Africa hit five-year high

The 2015 Africa attractiveness survey conducted by Ernst and Young (EY) revealed that foreign direct investment (FDI) into Africa reached US\$128bn, up by 136 per cent, in 2014.

The number of jobs created from FDI rose by 68 per cent in the same year, resulting in 188,400 new positions across Africa, according to the survey.

"In the past year, Africa has experienced stronger headwinds than in recent times. Consequently, economic growth this year is likely to be at its lowest in five years, dragged down by the impact of lower oil prices on the Nigerian and Angolan economies, the softening of other commodity prices, and South Africa's sluggish growth," said Ajen Sita, chief executive officer of EY Africa.

[www.africanreview.com/finance](http://www.africanreview.com/finance)

## Ethiopia to invest US\$1bn in manufacturing sector

Ethiopia is planning to invest US\$1bn in industrial parks over the next decade to boost exports, improve the textile sector and enhance the country's overall position as a major manufacturer. The country is targeting a 15-fold increase in textile and leather exports.

Arkebe Equbai, special advisor to the Ethiopian Prime Minister said, "In terms of industrial development and manufacturing development, we want to make Ethiopia number one in Africa."

[www.africanreview.com/manufacturing](http://www.africanreview.com/manufacturing)

## APR Energy signs 35MW Botswana power generation deal

APR Energy has signed a contract with the Botswana Power Corporation to provide the country with 35MW of electricity over a two-year period.

Under the terms of the deal, which was signed with Botswana's national energy utility the Botswana Power Corporation (BPC), APR will build and operate a fast-track, turnkey power plant outside the country's second-largest city, Francistown.

To be located adjacent to BPC's existing 70MW facility, APR said the new plant had been scheduled for commissioning in Q3 2015 and will feature diesel power modules from one of the firm's former projects in Libya.

[www.africanreview.com/energy-a-power](http://www.africanreview.com/energy-a-power)



The new plant is expected to be commissioned in Q3 2015 (Photo: APR Energy)

## ACEI to invest in West Africa's largest wind farm

American Capital Energy & Infrastructure (ACEI) has announced its intention to invest in a 152MW wind farm in Senegal.

The firm announced this week that it will be contributing more than US\$85mn to the US\$343mn project at Taiba Ndiaye, 75 km north of the capital, Dakar. The wind power project will be the first of its kind to be constructed in Senegal and will be the largest wind farm in West Africa.

"This project makes a lot of sense for Senegal - both from an economic as well as an environmental standpoint," said ACEI's CEO and co-founder Paul Hanrahan.

[www.africanreview.com/energy-a-power](http://www.africanreview.com/energy-a-power)



The 152MW wind farm will be first of its kind in Senegal (Photo: Johan Swanepoel)

## Ecobank Transnational appoints new group CEO

Ecobank Transnational Incorporated has appointed Ade Ayeyemi as the new group CEO, with Ayeyemi's new role effective 1 September 2015.

Ayeyemi will replace Albert Essien, who will retire on 30 June 2015, having worked for the company for 25 years. Ecobank officials said that an interim arrangement would be made by the Ecobank Board for the management of the group during the period 1 July through 31 August, pending the resumption of the new group CEO.

Ade Ayeyemi said, "I am delighted to have been offered the opportunity to lead this institution and commend Albert Essien for his legacy work of helping further the premier pan-African financial institution."

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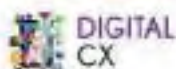
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# Ministry's master plan for running better rails

Assessing Ghanaian plans to develop the nation's railway network, as part of a larger drive to improve transport infrastructure

The Ministry of Transport says a railway master plan it completed in December, 2013 is to serve as the blueprint for the systematic development of the railway network in Ghana starting with redevelopment of the existing network. This is part of its efforts to turn the country into the transportation hub of the West Africa sub-region.

In a brief to *African Review*, the Ministry said the master plan which forms the blue print of a National Medium Term Development Framework (NMTDF), will guide the implementation of various programmes and projects in the sector to support the expansion of transport infrastructure and services throughout the country. It said, the current state of deterioration of Ghana's rail system has had a negative impact on the overall transport system as well as on the other trades the system serves, including, mining activities that have been suppressed as well as the accelerated deterioration of the country's road system. In addition, the poor railway system has led to an increase in transport costs due to lack of competition, failure to adapt rail system to changed market demand and the inhibition of



There is urgent need for new rail infrastructure (Photo: Emmanuel Yartey)

development of the hinterland.

## The upgrade underway

The Ministry intends to upgrade the existing Western Railway Line, and in line with that, plans have put into action for construction works to begin on the 11km Sekondi-Takoradi via Kojokrom suburban railway line which commenced in 2012. "The project is currently about 40 per cent complete and the Brazilian Government is assisting Ghana with funding

to implement the Kojokrom to Awaso section of the Western Railway Line reconstruction project," the Ministry stated. In addition, it said, arrangements are also on-going to secure an Indian Exim Bank facility to construct a railway line from Tema near Accra to Akosombo in the eastern region to link the Lake Transport services on the Volta Lake. It is also planned that there would be annual rehabilitation/maintenance works on the Accra-Nsawam and Achimota-Asoprochona rail lines are undertaken to ensure continuous operation of the suburban shuttle services.

"With regards to the Eastern Railway Line, a Transaction Advisory Service is currently underway with assistance from the World Bank to help Government engage a private sector investor under a public-private partnership (PPP) arrangement to develop the Eastern Railway Line to link the Boankra Inland Port in Kumasi," the Ministry said.

It is noted that, the railway sector had suffered decades of neglect and underfunding and therefore plans to support it in a grand way. The Ministry stated, "The existing rail network is completely broken down, except for partial freight services on the Western line and some passenger commuter rail services in Nsawam in the

## Egypt's Africa Together Initiative strengthens Ghanaian ties for trade

As a part of the country's efforts to increase IT exports and achieve ambitious economic goals, Egypt's Information Technology Industry Development Agency (ITIDA) helped setting out a number of partnership protocols and concluding business agreements between Egyptian companies and 17 leading African telecom companies, financial institutions and ICT enterprises, in 6 different African countries, in the framework of "Africa Together" programme, Round II.

In the area of field force automation & unified emergency response platform, Softec International partnered with IPMC from Ghana. Also, Smartec inked a contract with the Ghanaian Batilech in network optimisation and home automation. BI Technologies signed an agreement with IPMC from Ghana. Additionally, Bsystems Ltd from Ghana signed with Infasme and also with EME International. Hitekenofal, a leading provider of integrated communication network solutions since 1987 in Egypt, agreed to provide communications networking services to Batitech from Ghana.

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▶ eastern region, the capital, Accra and Tema."

There is dire need for renewal. Signal and communication equipment have become obsolete and inoperable, track infrastructure has deteriorated and, where lines have remained unused for years, encroachment has taken place. Against this background, "there is no doubt that the investment in the railways is capital intensive and therefore arrangements like PPP are now being considered in the investment drive".

#### Technical assistance on air

In the aviation sub-sector, the Ministry has already confirmed that efforts are underway to establish a new national air carrier under a PPP arrangement, adding that, "the recent suspension of operations of the Ghana International Airlines has left Ghana to rely on foreign-owned airlines to provide international connections including the fulfilment of Ghana's bilateral air service agreements".

Ghana's loss of FAA category 1 status means that direct flights cannot be operated by Ghanaian carriers to the USA. "The lack of Ghanaian owned aircraft to ply international routes has hampered the re-attainment of FAA Category 1 along with further mitigating circumstances such as the inadequate safety and security features at Kotoka International Airport."

Accordingly, the Ghana Civil Aviation Authority (GCAA) has signed a technical assistance agreement with the US Federal Aviation Administration (FAA) in a bid to

restore Ghana to FAA Category 1 status. Ghana however, has an Open Skies Policy with the USA, which has enabled United States airlines to operate to Accra. Going hand in hand with this is the expansion works at Kotoka International Airport (KIA). The first phase of the Arrival Hall expansion is partially opened for use and will be fully completed by the end of the 1st quarter of 2015. Negotiations are on-going for the award of contract for works to start in the first quarter of 2015 on the construction of a third terminal. In addition, construction of a Southern Apron at KIA for eight wide-bodied aircraft is nearing completion.

The Phase I of the Kumasi Airport rehabilitation work in the Ashanti region, involving the overlay of the runway and installation of an airport ground lighting (AGL) system, has been completed and commissioned for night operations to commence. In addition, the first phase of the Tamale Airport re-development project commenced in August, 2014 and is currently over 16 per cent complete. Similarly, the land acquisition process is on-going for the development of aerodromes in Ho and Cape Coast whilst plans are ongoing for the upgrade of Wa airstrip for commercial operations. The contractor on the project, the Ministry said, will soon mobilise at the proposed site for the Ho airport to commence works on the road link and fencing of the airport perimeter.

#### The maritime master plan

The Ministry also confirmed that the maritime sub-sector is also being given support under the master plan, with the involvement of Ghana Ports and Harbours Authority (GPHA). In line with this, major infrastructure works are on-going in the maritime sub-sector and are at various stages of completion. For instance, expansion of the existing Breakwater at the Takoradi Port by 1.15km is over 71 per cent complete while the construction of a cargo handling jetty to facilitate bulk cargo handling at Tema Port is about 35 per cent complete.

The Ministry confirmed, "The re-construction of Net-Mending Wharf for the canoe basin (Tema Fishing Harbour) is on-going and nearing completion. This will support local artisanal fishing industry in the Tema Community. An MOU has also been signed between GPHA and Meridian Port Service (MPS) for the development of two new container berths at the Tema Port."

In order to improve transportation on the Volta Lake three units of 50-seater high-speed passenger ferries have been procured and delivered to Akosombo for assembling while the construction of one unit modular passenger/cargo ferry has also been completed and ready for shipment. The ferries will be in operation by the first quarter of next year.

Funding arrangements are being finalised with the World Bank for the retrofitting of three of Volta Lake Transport Company's vessels with engines procured with funds by the Bank to improve operations on the Lake.

In the road transport services sub-sector, the Ministry has also confirmed that the Metro Mass Transit will continue with its programmes to improve on its services to passengers. In this regard, terminals are being constructed in the various regions. At the moment, the construction of the Tarkwa terminal in the western region has been completed and that for Aflao terminal in the Volta region is over 85 per cent complete.

"A supplier's credit facility has also been approved by Parliament for the supply of 200 buses to strengthen the operations of MMT. The buses have arrived at the Port and going through clearance procedures," the Ministry said. Similarly, Parliamentary approval has also been obtained for the acquisition of 290 Scania buses of which 245 would be used to operate the bus rapid transport (BRT) services and 45 to augment the fleet of inter-city state transport company (ISTC). Already, 10 of the Scania buses have been procured to start operation on the Amasaman to Accra Central Business District corridor. ■

*Francis Kokutse*

## Nigerian hotel firm looks to move into Ghana

HOTELS.NG, NIGERIA'S LARGEST hotel booking website, has secured an investment of US\$1.2mn from international investors EchoVC Pan-Africa Fund, a seed-stage technology fund, and Omidyar Network, the investment vehicle of eBay founder Pierre Omidyar. The funding round follows on from the company's 2013 seed investment of US\$225,000 from Lagos-based Spark.ng.

Mark Essien, founder & CEO of Hotels.ng, said, "We're forging ahead into relatively uncharted territory; e-commerce in Africa is a

massive market to conquer, but there are no hard and fast prototypes from which to follow; We cannot simply replicate Western models here, we have to build our own blueprints from scratch, which takes significant investment, both in terms of time and money. This additional capital will allow us to realize the next stage in our ambitious growth plans, which will see us consolidate our position as Nigeria's market leader in online hotel bookings, with a view to expanding our service into other African markets, such as Ghana."



Mark Essien, founder & CEO of Hotels.ng

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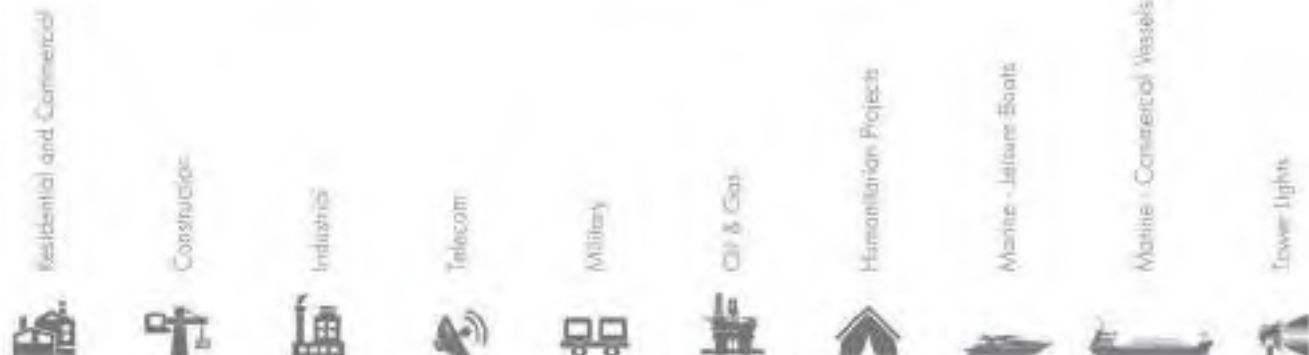
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# Taking steps to transform insurance

Insurance institutions in Botswana are helping clients by evolving diverse portfolios, means of payment, and advice

Insurance companies are key stakeholders in the development of economies. Money raised through insurance premiums, for example, can be recycled for investment in infrastructure and industries such as construction and mining and agriculture. Insurance companies in Botswana address requirements for general, life and health insurance, and pensions. Life insurance is dominated by Botswana Insurance Holdings Ltd, which is listed on the Botswana Stock Exchange, but there are several general insurance companies - including the Botswana Eagle Insurance Company, the Botswana Insurance Company and the Mutual and Federal Insurance Company.

## Risk management and solutions

Aon offers numerous products and services to fulfill risk management and risk solutions needs. Aon Risk Management (Pty) Ltd serves as a regional resource to the mining and heavy industry sector of Aon's client base in sub-Saharan Africa. As such, its consultants provide risk consulting services to existing and prospective clients throughout the region. As a global broker and risk management adviser, the company assists when negotiating terms and conditions in the global insurance and reinsurance markets, managing captive insurance

companies, introducing risk management products, or providing services such as post-loss investigations, baseline risk assessments, issue-based risk assessments, and disaster recovery planning.

Aon helps companies review existing plans and benefit costs, as well as deliver economies of scale, develop regional strategies and processes in support of business goals. Its risk solutions address several sectors - including the construction and mining sectors, financial industry, and energy enterprises.

## Evolving insurance and banking business

The Botswana Insurance Company (BIC) has taken steps recently to evolve the nation's industry in line with commercial and financial developments in the Southern African region. It has formed a partnership with Standard Chartered Bank (SCB) to provide innovative solutions in line with what has been termed the evolution of bancassurance. SCB and BIC now provide convenient and easy accessibility to insurance solutions to SCB clients. On this development, Johann Claasen, MD of Botswana Insurance Company Limited, said, "For a while now, insurance in Botswana continues to be difficult to obtain for the vast majority of people. Through this bancassurance partnership with Standard Chartered, we will be able to provide useful

and relevant general insurance products to Standard Chartered Bank clients. We strongly believe this partnership will help us deliver our commitment to our society, shareholders and regulators."

Moatlhodi Lekaukau, CEO of Standard Chartered Bank of Botswana, was enthusiastic about the partnership from the off. He said, "Bancassurance in Standard Chartered has evolved to ensure that the distribution partnership with Botswana Insurance Company provides our esteemed clients a selection of general insurance offerings that touch on the protection of their assets when they may not necessarily be in a position to do so. They will help our clients plan and make provision for the unexpected with minimum financial strain."

The business partnership is being driven by BIC's RiskFin Solutions brand, which is responsible for strategic affiliations within the financial sector. The Riskfin unit, which is headed by Kutlwano Mabeo, takes into account that the sector is dynamic and continuously changing which makes it vulnerable to more risks from which insurable solutions may be positioned driven by needs.

This partnership development is critical not only to the success of BIC, but to its stakeholders and end-consumers. Johann Claasen further stated that SCB & BIC have

## Botswana's insurance entities

According to the Commonwealth of Nations, there are around 16 licensed insurance companies in the country, spanning general, life and health insurance, and pensions. The nation's industry is regulated by its Registrar of Insurance, operating under the Ministry of Finance and Development Planning. Insurance entities operating in Botswana include: Aon Botswana; Atlantis Insurance; Botswana Eagle Insurance Co Ltd; Botswana Insurance Co; Botswana Insurance Fund Management; Botswana Insurance Holdings Ltd; Botswana Life Insurance Ltd; Carlton Insurance Agencies Ltd; Consolidated Insurance Services; Coversure Insurance Broker; Drive Insurance Brokers; Export Credit Insurance and Guarantee Insurance Co Ltd (BECI); FirstLife Assurance Ltd; General

Insurance Botswana; Hollard Insurance Botswana; Huraya Insurance Brokers; I-Flex Insurance Agencies Ltd; Innovex Insurance Brokers; Jebrolter Ltd; KPMG; Letsema Insurance Brokers; Letshego Guard Insurance Co Ltd; Letshego Life Insurance Ltd; Liberty Botswana; Metropolitan Life of Botswana Ltd; Metsure Insurance Agency; Mutual & Federal Insurance Co Ltd; Northern Insurance Agency; Omega Insurance Brokers Ltd; Panrich Insurance; Prefsure (Botswana) Ltd; Regent Insurance Botswana; Rhino Insurance Service; Sedgwick Insurance Brokers Ltd; Sesiro Insurance Co Ltd; Shangor Insurance Brokers; Thebe Insurance Brokers; Tswana Insurance Brokers; and Zurich Insurance Co Botswana Ltd.

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worked effortlessly on ensuring that the right strategic affiliation is formed with the most important component in mind - and that is the customer. He said, "The focus going forward is to provide complete insurance services under the 'one roof concept' to Standard Chartered Bank clients."

Innovations in the financial sector also include BIC's introduction of a facility for BIC Clients to pay premiums through Orange Botswana accounts, so BIC customers can make their premium payments directly using their mobile phones.

#### Specialist insurance solutions

As well as its interest in working with banks and mobile network operators, BIC is representative of the kinds of specialised forms of insurance available through Botswanan institutions. So, for example, BIC offers agricultural products, covering all aspects of a farmer's operations including buildings, movable assets, personal accident, personal and business all risks, burglary, goods in transit, public liability, motor vehicles and cattle. It facilitates aviation insurance, offering both hull all risks and hull war risk arrangements, as well as legal liabilities to third parties and legal liabilities to passengers. Its portfolio for directors and officers liability covers for claims against such position-holders for any wrongdoing in post - including errors and omissions in decision-making or action whilst acting in a capacity of director or officer. BIC's pension fund trustees liability schedules address negligence, theft fraud and dishonesty and computer crime, limiting insurers' liability to losses incurred by the insured relative to pension/provident/disability/trust monies in respect of past, present or future employee benefits.

#### Taking care of goods in transport

There has been a growing trend, in recent years, of criminals targeting rented commercial vehicles. A common example of such crime involves fraudsters deceiving people into believing that they have secured a contract to supply major institutions in Botswana and their services are required to collect the stock in South Africa. Transport companies are then coerced into a contractual agreement - and deposits are paid in cash only and invoices issued for the services, making all seem credible. However, the fraudulent individuals inform their 'customers' that they will meet with their partners at the border before crossing over. Once in South Africa, the driver is directed to pick up additional helpers. Typically, on arrival at the 'pick up point', the driver is told that the collection point has been changed. It is then that the hijacking takes place.

BIC reports that its clients have experienced such crimes. In one instance, the driver was held captive for two days before he was released unharmed. BIC advises that contractors ensure invoices and delivery documents are verified. Search

online, for example, to verify a company's details and contact the company - preferably, by landline. Do not accept cash and request that some form of electronic funds transfer (EFT) takes place - that way there is an audit trail. ■

## S & P affirms Botswana's sovereign credit rating, as economy grows stronger

Standard & Poor's (S & P) recently released the results of the first of the two annual reviews of Botswana's sovereign credit rating for 2015. The long-term and short-term ratings of 'A-' and 'A-2', respectively, have been affirmed. The "stable" economic outlook has also been retained.

The ratings are supported by the country's robust institutions as well as the strong external and fiscal balance sheets, well managed economy and a long record of political stability. The stable outlook reflects expectations of resilient economic growth, fiscal surpluses and continued institutional strength.

However, the ratings are constrained by the country's narrow economic base and its vulnerability to external shocks, despite efforts to diversify the economy away from its heavy reliance on the diamond sector. The ratings could also come under pressure if economic growth was to falter or if the country's fiscal or external positions were to deteriorate. On the other hand, reduced dependence on the mining sector for current account and fiscal receipts through successful broadening of private sector development, which could boost GDP growth relative to other middle-income countries, could lead to a possible ratings upgrade.

The rating aligns with a positive economic outlook and risk assessment for Botswana. Global output is projected to increase by 3.5 per cent in 2015, compared to the estimated growth of 3.3 per cent in 2014, and 3.7 per cent in 2016 due to improving performance in advanced economies, supported by low oil prices. However, growth dynamics differ among countries while geopolitical risks and structural impediments constrain medium-term growth prospects.

For Botswana, total GDP growth is estimated at 4.4 per cent in 2014, in this way reflecting the 4.5 per cent and 4.4 per cent expansion in mining and non-mining output, respectively. Inflation fell from 3.6 per cent in January to 2.8 per cent in February 2015.

## US Ambassador Miller launches African Women's Entrepreneurship Program in Gaborone

Underscoring American commitment to economic diversification in Botswana, US Ambassador Earl R Miller launched the African Women Entrepreneurship Program (AWEP) Botswana Chapter in Gaborone recently. AWEP is a trade and investment initiative started by the US Department of State in 2010 as a professional exchange initiative.

In partnership with USAID, AWEP provides professional networking, business development and trade capacity building opportunities to networks of prominent female entrepreneurs across sub-Saharan Africa. Since the inception of AWEP, the US Embassy in Gaborone has sent participants to the United States on professional exchange opportunities under the International Visitor Leadership Program - with the fifth such entrepreneur from Botswana travelling to the USA in July 2015.

Over the past five years Botswana AWEP alumni spearheaded the formation of a local chapter aimed at growing production capacities of women to export goods and services. The Chapter is now a registered non-governmental organisation (NGO) with the Botswana Government's Registrar of Societies and boasts a membership of 60 female entrepreneurs, mainly youth.

At the launch Ambassador Miller stated, "With the official launch of AWEP's Botswana Chapter we look forward to even deeper engagement to increase Botswana's exports, especially those spearheaded by women, through the African Growth and Opportunity Act (AGOA)."

Ambassador Miller stressed that the US government is pleased that Botswana's exports to the US under the African Growth and Opportunity Act (AGOA) increased by over 50 per cent in 2014, and that he hopes this trend will continue. He affirmed that the US Embassy assists small and medium enterprises (SMEs) in accessing credit through a USAID Development Credit Authority agreement with Barclays Bank, which allows SMEs to access up to US\$15mn in loans. He stressed the US government also provides technical assistance through USAID's Southern African Trade Hub to streamline regional customs procedures and assist businesses.

# Kirloskar Brothers Limited expands into North Africa

*African Review of Business and Technology* spoke with Narayan Mirji, Regional Head of Kirloskar Brothers Limited for North Africa, about the development opportunities for the company in Africa

Narayan Mirji is the Regional Head of Kirloskar Brothers Limited for North Africa and is based in Cairo Egypt. He also heads the operations of SPP Pumps MENA LLC in Egypt, a subsidiary company of KBL engaged in assembly, testing and packaging of value added pumping systems and services.

## **African Review: Can you give an overview of your company and the projects you take part in?**

**Narayan Mirji:** Kirloskar Brothers Limited (KBL) is a global fluid management solutions provider and the largest manufacturer and exporter of centrifugal pumps and valves from India. KBL has been one of the prominent players in the field of constructing large irrigation pumping stations. Over the last five decades KBL has constructed more than 50 pumping stations in Egypt irrigating close to 150,000 Ha of land. KBL has successfully executed turnkey projects for both the Government and the Private investors in the field of irrigation pumping stations.

KBL has received new contracts from the Ministry of Water Resources and Irrigation, Mechanical & Electrical department, Egypt for the supply, installation and commissioning of large Horizontal Split Casing pump sets and Vertical Turbine pump sets.

Besides irrigation, KBL has supplied 28 Nos. large pump sets to Alexandria Water Company, Egypt for supplying raw & treated water to the Alexandria city.

KBL bagged a prestigious contract from Morocco for the supply of vertical turbine pump sets for Loukkos Irrigation project. Also supplied end suction / split case pump sets in stainless steel material for a water supply project in Morocco.

## **African Review: How are your products different to that of your competitors?**

**Narayan Mirji:** KBL is known for custom made pumps often used for many critical



Narayan Mirji, Regional head of Kirloskar Brothers Limited

applications / site wherein the pumps are specifically designed for the application and the site conditions. One example which we could mention here is the supplies made to Alexandria Water Company, the pumps are tailor made to suit every aspect of hydraulic and mechanical design of the existing pumps / site conditions. KBL is also known as "Complete Solution Provider" rather than a product supplier. Imparting training to our customers through structured training programmes makes us even more different.

## **African Review: Which countries in Africa are you exporting products to? Will you be targeting more countries?**

**Narayan Mirji:** At present Egypt, Morocco, Tunisia, Algeria, Ethiopia, Sudan, Nigeria and Ghana are the focus countries that we are exporting to.

## **African Review: Have you built a reputation in the construction, water, power and other sectors? How are you looking to build on this?**

**Narayan Mirji:** We are strengthening our presence in the construction sector through

our newly launched facility in Egypt, SPP pumps MENA LLC, wherein we will be supplying value added pumping packages viz., UL listed firefighting pumps, HVAC pumps, etc., As I mentioned, for the water sector, we already have made supplies to various customers and it's going to be our potential market in most of the countries that we are operating in to.

We have started working in the power sector, especially in Egypt since there are big investments happening and at present we don't have significant presence in this sector.

## **African Review: Are you seeking to add to your product range?**

**Narayan Mirji:** Yes. We would like to introduce Lowest life cycle pumps in this region, which will benefit our esteemed customers with consistent and efficient performance. Introducing Concrete Volute pumps is another opportunity, which is cost effective and highly reliable pumping equipment.

## **African Review: How are your products tailored to customers' needs?**

**Narayan Mirji:** We go into the details of application, site conditions and then decide hydraulic and mechanical design of the pumps so that it's a precise solution to our customer. This could be challenging but KBL overcomes this with the technical expertise of engineers who, at all times, recommend tailor-made pumping solutions to customers.

## **African Review: In terms of developing your products, what is your future expansion strategy?**

**Narayan Mirji:** We have plans to expand our Egypt facility. We would like to build local vendor base and manufacture some of the components locally to offer cost effective products /solutions. ■



# Stability and growth in frontier markets

African economies are increasingly robust and policy-making increasingly conducive to progressive investment frameworks

The latest projections from the International Monetary Fund (IMF) show that sub-Saharan Africa (SSA) remains among the world's fastest-growing regions, despite weaker oil and commodity prices, uncertain external financing conditions and the Ebola epidemic in worst-affected countries (Liberia, Sierra Leone and Guinea). The region has enjoyed strong economic growth of 5.2 per cent on average over 2010-2014 driven by investments in mining and infrastructure, as well as buoyant private consumption in many countries.

Africa, the home to nearly one billion people is now beginning to take its rightful place at the table of global prosperity. The expanding middle-class population is creating demand for construction and services industry. Notwithstanding the challenges, opportunities for businesses are plentiful. The World Bank commented: "Despite strong headwinds and new challenges, sub-Saharan Africa is still experiencing growth. And with challenges come opportunities."

The IMF and the World Bank expect a slowdown during 2015; however, there are significant differences across regions. The downturn in international petroleum markets has affected oil-exporting countries (especially Angola and Nigeria, SSA's largest and third-largest economies), which supply three-fourths of Africa's oil output. Real GDP growth will falter as fiscal consolidation dampens economic activity (Table 1) - with public investment bearing the brunt of ongoing fiscal tightening in oil-producing countries.

With limited buffers, the Nigerian authorities are cutting capital spending, whilst adjusting monetary and exchange rate policies to relieve pressures on the Naira. Lower capital spending also affects Nigeria's non-oil growth, which averaged 7.8 per cent over 2013-14. Crude prices should rebound but will remain below the US\$100/barrel level of recent years.

On the one hand, oil-importing countries are still growing briskly, notably Congo (DRC), Ethiopia, Cote d'Ivoire Tanzania,

Rwanda and Kenya. Excluding South Africa, which is hindered by mining strikes and electricity supply constraint, real GDP growth of oil-importers is predicted at 5.9 and 6.6 per cent, respectively this year and next. However, the impact of cheap fuel is partly offset by lower prices of other commodities that they export. Since June 2014, the price of iron ore, coal, platinum, cotton, copper, and gold have dropped by 44; 22; 22; 21; 7.5; and 5 per cent, respectively (Chart 1).

Output in three Ebola-hit countries of sub West Africa has contracted due to severe disruptions in agriculture and services and the postponement of mining development projects. The situation is grim in Sierra Leone, where main iron ore mines have ceased operations and GDP growth is likely to drop by 13 per cent - compared to robust growth of 20 per cent in 2013.

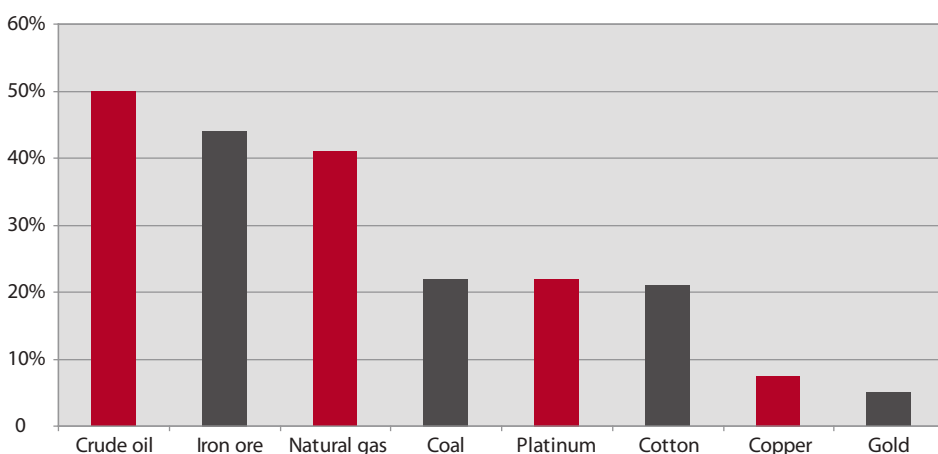
## Greater resilience

Low inflation, reduced levels of public debt, and adequate reserve levels have helped to shield much of the region from global downturn in recent years. Weak energy and food prices have helped underpin generally subdued inflation environment, which could allow countries dealing with tepid growth to adopt more lax macroeconomic stance. Monetary policy has been tightened in some places where currencies have come under pressure.

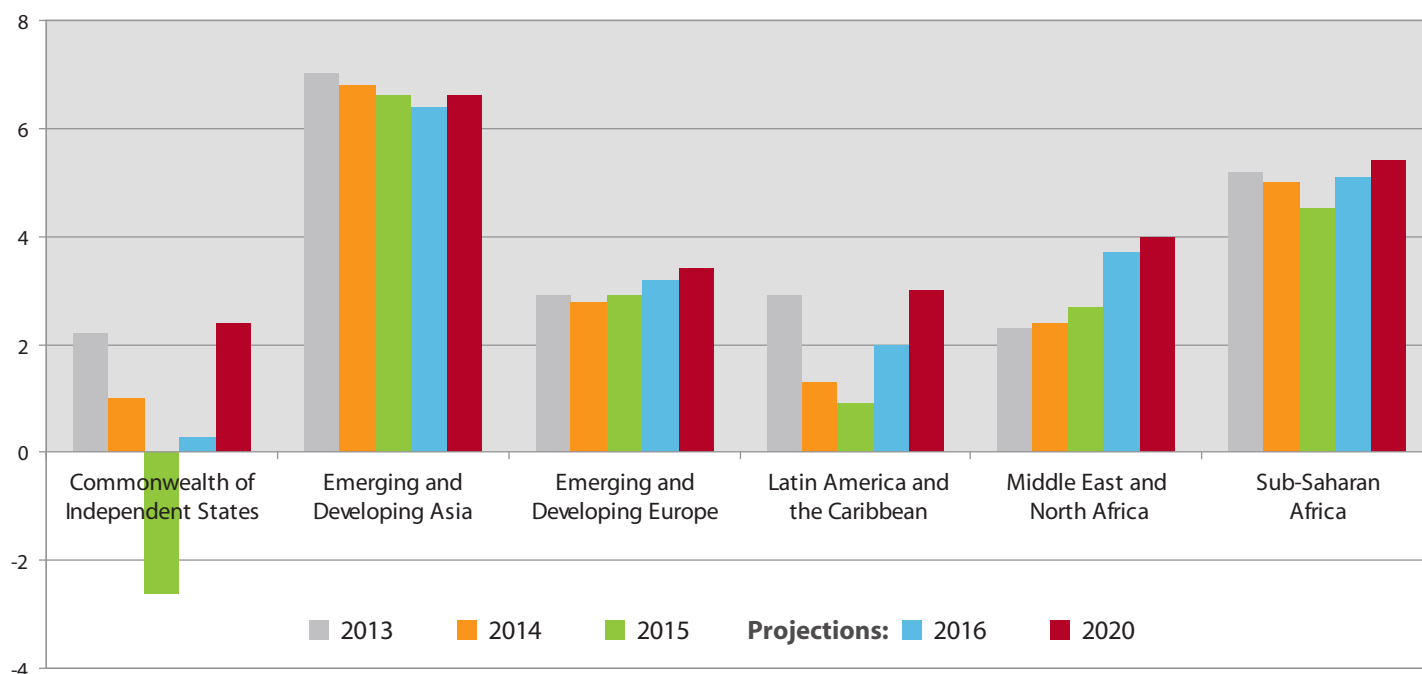
The eight oil-exporters are tightening fiscal policy that should partially offset the impact of depleting revenues, but budget deficits are still projected to widen by about 3/4 of percentage point of GDP relative to 2014. Government debt is forecast to grow by some two percentage points of GDP, with more substantial increases in few countries (notably Equatorial Guinea).

Current account deficits are expected to widen significantly for oil-exporters, with large increases in Chad and Equatorial

**Chart 1: Selected Commodity Prices,**  
Change from June-2014 to March 25 2015



Source: Bloomberg, LP.

**Chart 2: Summary of Output Growth, By Developing Regions (annual % chg.)**

Source: IMF World Economic Outlook, April 2015.

Guinea. Conversely, among most oil-importers, current account balances are expected to improve. However, for a few resource exporters, including Namibia and Congo DRC, the decline in other commodity prices could have bigger spillovers than lower oil prices - hence leading to deteriorating current account balances.

#### External influences

In today's global village, Africa's prosperity is mainly tied to outside factors. Among major trade partners, the weakness in Eurozone and Japan poses downside risks to global

recovery. Similarly, the slowdown of China's investment-led growth in 2015-16 could reduce demand for raw material exports - driving regional growth lower and widening fiscal deficits, whilst curtailing foreign direct investment (FDI) in natural resources and infrastructure.

The U.S. dollar's appreciation versus the euro in recent months has regional implications, where most Francophone countries have formal pegs to the euro and a few others peg informally to the dollar. Most national currencies have depreciated significantly against the greenback this year.

A stronger dollar harms the competitiveness of economies (mostly oil-exporters) that are broadly pegged to the dollar. "Some actually benefit and some suffer as a result of the dollar appreciation - they benefit because you get dollar pricing for the oil that you export and it sometimes compensates a little bit for the decline in oil prices," explained IMF managing director Christine Lagarde.

In the near term, currency weaknesses increase the cost of imports, much of which is typically related to investment, with adverse effects on productivity growth. Furthermore, a depreciated exchange rate increases debt service costs where dollar-denominated debts represent a larger share of total public debt - subsequently resulting in deteriorating balance sheet positions of banks and private sector entities. Finally, in some countries, depreciation can fuel rising consumer prices, thus curtailing domestic demand.

#### Possible reversal in investor sentiment

Thanks to ample global liquidity and ultra-low US interest rates, an increasing number of African countries have tapped capital markets; concurrently, the outstanding stock of Eurobonds has grown almost fourfold over past five years. Sovereign bond issuances rose from US\$6.5bn in 2013 to US\$8.7bn in 2014, with maiden issuances by Côte d'Ivoire, Ethiopia, and Kenya. Following a period when they remained low/stable, emerging and frontier market spreads, have risen significantly in the first-half of 2015.

**Table 1: Sub-Saharan Africa: Key Macroeconomic Indicators**

	2012	2013	2014	Projections	
				2015	2016
Real GDP Growth (%)	4.2	5.2	5	4.5	5.1
Of which:					
Oil-exporting countries	3.7	5.7	5.8	4.5	5.2
Oil-importing countries	4.6	4.8	4.4	4.5	5
Consumer Prices *	9.4	6.6	6.3	6.6	7
Fiscal Balance (% of GDP, incl. grants)	-1.8	-3	-3.3	-3.7	-2.9
Total Investment /	21.1	20.7	20.6	20.9	21.5
Gross National Savings /	18.7	17.6	16.9	16.4	17.4
Government Debt /	27.4	28.5	29.6	32	32.4
<b>Exports of Goods &amp; Services</b>					
(% of GDP /	31.1	29.6	27.6	25	26.1
Imports of Goods & Services /	32	30.9	30.1	29.9	30.3
External Current Account /	-1.9	-2.5	-3.3	-4.6	-4.1
Foreign Exchange Reserves **	5.4	5.2	5.4		
Net Foreign Direct Investment /	2.1	1.5	1.8	2.1	2.5
External Debt to Official Creditors /	8	8.6	9	10.7	11.2

\*Annual average, % chg; /% of GDP; \*\* Months of imports of goods & services.

Source: IMF, World Economic Outlook database.



Table 2: Projections for Key African Markets

	Real GDP Growth (%)		CPI* (%)		Current Account (% of GDP)		Total Exports (% of GDP)		Total Investment (% of GDP)	
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
<b>Oil-Exporters</b>										
Nigeria	4.8	5	9.6	10.7	0.7	1.3	12.4	13.8	15.6	16
Angola	4.5	3.9	8.4	8.5	-6.3	-4.2	36.3	36.5	9.2	10.4
Gabon	4.4	5.5	2.5	2.5	-2.3	0.9	46	47.3	31	30.2
Equatorial Guinea	-15.4	3.7	3	3	-32.5	-18.3	82.5	85.2	80.4	65.7
Congo, Rep. of	5.2	7.5	3	2.9	-11.3	-3.1	68	73.8	43.3	34.3
<b>Middle-income Countries</b>										
South Africa	2	2.1	4.5	5.6	-4.6	-4.7	32.9	32.8	20.7	22.2
Ghana	3.5	6.4	12.2	10.2	-7	-6.2	33.2	34.4	23.6	24.7
Cote d'Ivoire	7.7	7.8	1.2	1.5	-2.3	-1.7	43.5	45.2	17.8	18.3
Cameroon	5	5	2	2.1	-4.8	-4.8	24	24.7	22.2	21.5
Kenya	6.9	7.2	5.1	5	-7.7	-7.4	18.8	18.8	24.2	24.1
<b>Low-income Countries</b>										
Ethiopia	8.6	8.5	6.8	8.2	-6.6	-6.3	12.4	12.9	34.6	33.4
Mozambique	6.5	8.1	5	5.6	-41.1	-45.6	31.1	32.9	51.6	56.6
Tanzania	7.2	7.1	4.2	4.5	-10	-9.5	18.9	19.2	31.6	31.8
Uganda	5.4	5.6	4.9	4.8	-8.8	-9	20.9	21.5	35.3	35.5
Rwanda	7	7	2.9	4.4	-10.5	-10.1	14.8	14.4	25	24.8

Source: IMF, *Regional Economic Outlook Sub-Saharan Africa*, April 2015.

➤ Evidence suggests that investors are discriminating more carefully among SSA markets, with spreads increasing more sharply in some countries.

Therefore, yields on the region's bonds are trending up, especially in Ghana (owing to galloping fiscal-external deficits), Zambia (impacted by low copper prices), Gabon and Nigeria (the oil shock). The interest rate on Cote d'Ivoire's US\$1bn Eurobond issue in February 2015 was almost 100 basis points higher than its first issue in October 2014.

Given the probability of tightening global financial conditions alongside limited funding opportunities in domestic/regional markets, capital-raising may suddenly become difficult or borrowing costs may surge. The imminent normalisation of US monetary policy (i.e. a gradual lifting of quantitative easing by the Federal Reserve Board) would prompt a broader reassessment of emerging market risk. Should this risk materialises and financing costs increase sharply, those African

governments planning Eurobond issues should reconsider their plans advised the IMF, though, such financing is critical to addressing public investment needs of buoyant frontier markets.

Depreciation of national currencies increases the cost of servicing international bonds. "Quite a few sovereigns and more so corporates have borrowed in dollar-denominated loans, which are creating a difficulty there. They have to keep a tight ship and try to really be very cautious with their public spending," noted the IMF.

#### Looking ahead

The resource-rich countries would benefit from encouraging more rapid economic diversification by addressing chronic infrastructural bottlenecks to private sector activity (including by small and medium-sized enterprises) and improving their business environment, where most African countries rank low in the World Bank/IFC annual Doing

Business surveys. The World Bank puts it: "The end of the commodity super-cycle has provided a window of opportunity to push ahead with the next wave of structural reforms and make Africa's growth more effective at reducing poverty."

Achieving sustained, robust, and inclusive growth remains the overarching priority for the region. That, in turn, demands building solid infrastructures to create jobs, fulfilling social needs of a growing population in the midst of a demographic transition and expanding trade with both developing and developed world, whilst integrating successfully into global value chains.

In sum, SSA's growth over the medium-term is projected to exceed peer developing regions (Chart2). Investors have benefited over years from higher returns in diverse sectors as energy, mining, ITC, tourism and manufacturing. ■

*Moin Siddiqi, economist*

## Consumer demand to drive the next wave of African PE investments

Meeting current needs of Africa's billion-plus population and the demands of the emerging middle-class will drive the next wave of private equity (PE) investment on the continent. However, investors are keener to do business in sectors that have little to no direct relationship with government, or through structures that limit government control and undue influence. This is the view of Dapo Okubadejo, partner & Africa head, deal advisory & private equity at KPMG, who finds that numerous investors are realising that the best way to exploit the significant

growth potential in Africa would be to invest in sectors that talk to the fundamentals of Africa's growth story. These include the geographical size and sheer diversity in the markets on the continent, the young population and, the very high rate of urbanisation in Africa that is also creating increased disposable or discretionary income among the emerging middle class.

Mr Okubadejo said, "These socio-demographic factors are not only a positive show of sustainable growth in certain economies, but also demonstrate that there

will be rapid growth in needs and demands for consumables, which bodes an immense opportunity for investors in consumer facing sectors – including for instance, fast moving consumer goods, healthcare and financial services. Additionally, in most African countries these sectors have been reformed, where they are predominantly in private hands and there is a clamour for improved services and efficiencies, which will be best achieved through increasing competition and bringing new innovations, solutions and products to local markets."

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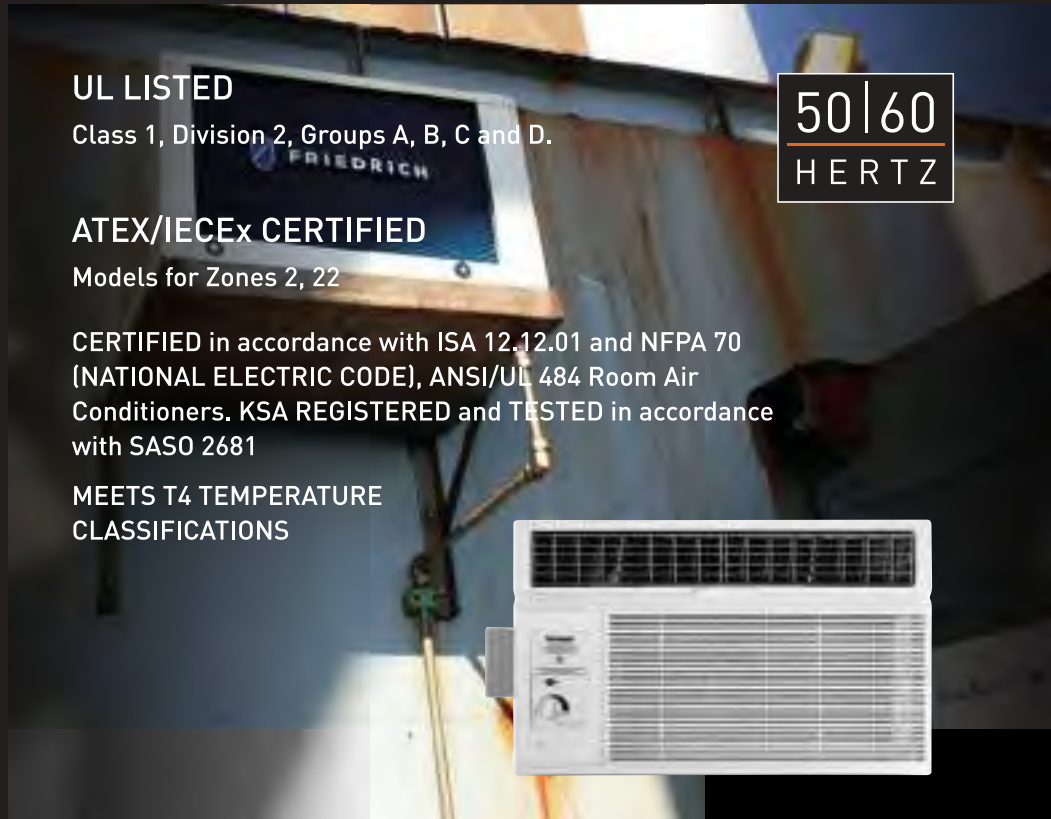
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# Renewing the core – the FCMB story

As African banks look to expand across the continent, the consolidation of systems and processes is fast becoming a priority, as institutions aim to improve their operational efficiency and increase the control they have over their own operations. First City Monument Bank partnered with Infosys Finacle to achieve this and enhance customer service with a new generation banking technology infrastructure.

**O**VER THE PAST few years, Africa's economy has been among the fastest-growing in the world. With this, the financial system is showing increased appetite for leveraging modern technology. Many African banks are looking to expand their business across the continent, either organically or through acquisitions. The consolidation of systems and processes is a key priority to improve operational efficiency and enhance control over their operations. Furthermore, along with economic growth, central banks across the continent are focused on policies for enhancing financial inclusion. This requires banks to broaden their reach and bring the vast unbanked and under-banked population into their client base. For instance, retail banking in sub-Saharan Africa is estimated to grow at a compound annual rate of 15 per cent. Technology will play a pivotal role in this.

Africa is an important market for Infosys' universal banking solution Finacle, accounting for more than 20 per cent of Finacle's global customer base. The firm is present in 18 countries across the continent and is always looking to expand into new markets.

**“ We have localised our solutions to meet domestic requirements and developed a robust ecosystem of empowered partners to provide a full range of services and support to our customers in the market**

**- Venkatramana Gosavi,**  
Regional head of growth markets, Infosys Finacle

“We see this as a great opportunity for Finacle and we are sustaining our investments to enhance our regional presence. We have localised our solutions to meet local requirements and developed a robust ecosystem of empowered partners to provide a full range of services and support to our customers in the market,” says Venkatramana Gosavi, regional head of growth markets, Infosys Finacle.

Finacle is essentially a new generation modular universal banking solution, which is built on open systems and uses industry standard platforms and technologies to deliver rich functionality to banks. It provides comprehensive solution coverage for retail, corporate, SME, Islamic finance, microfinance and private banking functions. Being componentised, Finacle provides banks the flexibility to modernise at their own pace, either



First City Monument Bank (FCMB) in Nigeria has used Infosys Finacle's applications for almost 10 years

➤ progressively or in an integrated manner. Moreover, its enterprise-class components enable banks to break down product-centric silos and eliminate duplicate functions and systems. In addition Finacle provides an advanced architecture which ensures real-time, cloud-ready, 100 per cent service-oriented architecture with 24/7, multi-entity, multi-currency capabilities.

“Scalability wise, Finacle is easily the most scalable solution in the world. Currently, we are deploying what will become the world’s largest core banking implementation at India Post, with more than 150,000 branches and more than 200mn customers, underlining the solution’s extreme scalability,” Gosavi notes.

### Case history: FCMB

First City Monument Bank (FCMB) in Nigeria has successfully used Infosys Finacle’s applications for close to a decade. FCMB has implemented various versions of Finacle’s core banking application and is currently migrating to the latest version of this and other business applications, including a CRM (customer relationship management) system. The bank’s treasury operation is also based on Finacle’s Treasury platform. FCMB has also invested in converged infrastructure for more reliable platforms as a beginning of its journey to cloud computing.

A key business objective for the bank is to deepen its retail presence, underpinned by its 2012 merger with Finbank Bank. Emeka Eboegbune, CIO at FCMB, says, “Our Finacle 10 implementation is to enable more flexible and retail-focused products for our customers. We are current leaders in the retail consumer-lending space and intend to keep that lead by upgrading our retail-lending platform to a much more flexible and feature-rich one.”

The bank is also implementing Finacle’s CRM solution, a modular, web-based customer-centric application that provides a unified 360° view of the customer across product lines and multiple back-end systems. It enables banks to improve customer experience across channels and empowers them with a platform for cross-sell opportunities, according to Infosys.

“Our priority over the next 12 months is to reduce our cost-to-income ratios through technology, while still achieving a new industry benchmark in helpfulness, reliability and customer focus. We are investing in robust infrastructure and security to meet and exceed customers’ expectations, while maintaining stakeholders’ trust in the FCMB brand,” Eboegbune added.

“The technology landscape in Nigeria for banks is trending towards providing convenient products and services on mobile devices and towards cloud (private inclusive) computing for more reliability. A key game changer for banks



First City Monument Bank CIO  
Emeka Eboegbune

is also their ability to use social media in a secure and productive manner. Some of the technology challenges we face include the availability of reliable network infrastructure across the country and the security of the bank’s infrastructure and power supplies. An increase of electronic fraud incidents is another major challenge,” he remarks.

“The market can look forward to simpler banking services. We have social banking services and mobile applications (apps) for banking services. Currently, we are the only Bank in Nigeria that instantly issues Visa Card. We have been doing this for our Verve and Mastercard products for a while now. We also provide instant account opening via our various channels, such as mobile and web, whereby a customer can get their account number and

**“Our Finacle 10 implementation is to enable more flexible and retail-focused products for our customers. We are current leaders in the retail consumer lending space and intend to keep that lead by upgrading our retail-lending platform to a much more flexible and feature-rich one. Our priority over the next 12 months is to reduce our cost-to-income ratios through technology, while still achieving a new industry benchmark in helpfulness, reliability and customer focus.**

- Emeka Eboegbun,  
CIO, First City Monument Bank.



Infosys Finacle regional head of  
growth markets Venkatramana Gosavi

card instantly, from any place, without needing to visit a branch.”

With the upgrade of its core banking application still in progress, Eboegbune states that the business case for the upgrade relates to the various customer “pain points” that the upgraded version will have to address and redefine in a positive manner.

“These new features and services have been carefully documented and will form part of our systemic sensitisation to customers communications prior to and after the roll out of the new platform,” he notes, adding that the plan will aim to create a positive buzz that will drive customer awareness and ensure they are able to conduct transactions in both a simple and seamless manner.

While security threats faced by banks in Africa are relatively similar to those faced by banks in other parts of the world, including cyber and insider threats, Eboegbune says that banks in Africa often struggle to deal with such threats due to a dearth of capabilities, citing a lack of skills, poor infrastructure and other physical security and social challenges.


Despite these difficulties, FCMB has been able to successfully implement new applications with positive initial results.

“We are still in the process of implementing the upgrade as mentioned earlier and the benefits are yet to be realised, but we have been excited by the test results of these features that we have seen thus far,” Eboegbune remarks.

“Our technology strategy is changing the bank’s focus from being a technology driven bank to a technology outfit that provides banking services. In other words, we want banking to be so simple, convenient and fun for our customers. We also want FCMB to be top in their minds and hearts because of the superior customer experience we provide. Banking is going to be synonymous with technology,” he concludes. ■



# Sailing in high seas



While the physical improvements to the container shipping sector, ports and port facilities in the region are obvious, it is the strategies of the shipping companies that determine how the ports will be used

African ports are playing a major role in transportation across the globe, with West African transit being particularly high

**T**he TEU, or Twenty-foot Equivalent Unit, describe the capacity of container ships and container terminals'. In 2014 the world's largest international shipping association, BIMCO, painted a very real picture of a 'fundamental oversupply of capacity in all of the major shipping segments' across the globe; effectively, more ships with huge transport capacity like containers, oil tankers, dry bulk and others, without the demand to use that available capacity in many cases.

When it comes to containers, Africa moves its fair share, though on a global scale it is small with considerable potential for growth. That potential in Africa, combined with the leading container shipping players such as Maersk and MSC having major facilities and intentions along the West African coastline with improved procedures, infrastructure and other factors all playing a part, bode well in the coming years. Yet, while the physical improvements to the container shipping sector, ports and port facilities in the region are obvious, it is the strategies of the shipping companies that determine how the ports will be used, which will be prioritised. Correspondingly, which ports and regions will prosper more as a result, that are not so easy to ascertain.

One of the issues is which of the new ports will play a key role as a Central and West African (CWA) transshipment hub and which of the big players will adopt it; such a hub needs to be central to operations in the region so it supports the activities of such markets as the Cameroon and the DR Congo. Those along with certain other regional nations are important and having a major infrastructural presence and role to play would encourage regional growth and trade with the likes of Latin America and Asia from CWA.

For instance, Lomé in Togo, Pointe-Noire in DR Congo and Walvis Bay in Namibia are all port cities with infrastructure of varying sophistication. That said, Walvis Bay is seen as too close to South Africa's ports to be of much additional benefit to the shipping lines and poor inland infrastructure. Lines of communications from the port is also a major drawback to outbound and inbound terrestrial logistics. And while Lomé is a cost-effective option from the local labour perspective and one with suitably deep water, Pointe-Noire is the preferred choice as a transshipment port for the region.

#### What's what

Around 30 major shipping operators are active in the CWA region running some 392

ships with a capacity of around 705,000 TEUs. Of these, 280 vessels are container ships with capacities between 1,000 and 6,000 TEUs, sitting below the global average size for such ships, in many cases. In the region, much of this capacity is used well in comparison with a global scenario where a higher level of demand has only recently begun to match the net supply of new ships coming on stream. One of the factors involved in this situation has been highlighted by BIMCO: container ships simply keep getting bigger, and while they may not yet be navigating the waters of CWA, record size vessels are being launched on an increasing basis. In November last year, the China Shipping Container Lines (CSCL) Globe was launched with a capacity of 19,000 TEU. Not only are such leviathans becoming more common, but their arrival adds to an already increasing average TEU capacity for such ships; those built in 2014 had an average increased capacity of 1,400 TEUs to a typical 7,400 overall capacity. This year, the projected average looks set to reach 8,000 TEUs, with a likelihood that much of that will remain empty on many transits for some time to come.

Of the operators active in the region, CMA-CGM, Maersk Line and MSC are the dominant players out of Asia and Europe.

“ **Of the services which depart from Asia, 80 per cent involve container ships with capacities on this Asia to West Africa route varying between 1,000 and 4,500 TEUs**

### ▶ Container Fleet Developments

Over the past 25 years, huge infrastructural and ship construction changes and developments have taken place in the container ship sector. Not least of these - which seems set to continue - is the increasing size of new builds that are being launched and plying trade on the high seas. But it's also the number of vessels that are sliding down the slipways that are keeping a level of supply ahead of global demand for their newly available space. Economic trends may change that in due course. However, with such new arrivals as the 16,000-TEU capacity CMA-CGM ships, the positive growth the global container fleet has seen since the early to mid-90s will likely continue, also taking advantage of the new technology behind some of the new construction and powering of these massive vessels.

In the mid to late 90s, fleet growth was very strong as post-Panamax vessels of over 4,500 TEU capacity joined en masse (these ships exceed the size of vessel capable of going through the Panama Canal, hence the name). Over the following few years, the sector growth saw the arrival of 8,000 TEU vessels followed by increasing deliveries of post-Panamax ships through the first decade of the century, with capacities from 300 to 3,000 TEU coming on stream. As well as large in number, the greater capacity vessels

increased the need for feeder services at hub ports around the world, including along the West African coast; these services are effectively the collection and redistribution of goods, often involving transshipment between large vessels, which call at a small number of major ports, where smaller 'feeder' vessels then load and carry the goods onto other minor ports, which the major shipping lines don't serve.

This has also helped to increase activity in and out of hub ports. But, like every other industry sector, the shipping container sector was not immune to the effects of the 2008 global financial crisis and the impact on order books, ships 'in construction' and contract cancellations was immense. Some vessels were mothballed, some deliveries were postponed, dragging out payment timeframes, but the growing result of a global economy in turmoil meant there was a lot of empty, unused space aboard many of the vessels out there.

Five years ago, the sector began to emerge from two years of 'dire straits' and increasing shipment volumes meant that over capacity was gradually utilised and some of the ships that had been dry-docked were reintroduced into service. Today, while there is still an over-capacity on several routes which hits the headlines from time to time - 'full containers out, empty containers back' - with the huge numbers of new and larger vessels entering service the over-capacity issues could, according to some sector analysts, be worse.

### From West Africa to Asia

Getting back to the situation in CWA, if we look at its activities with Asia, it points to a very healthy and probably the largest trade route to and from the region. Of the services which depart from Asia, 80 per cent involve containerships with capacities on this Asia to West Africa route varying between 1,000 and 4,500 TEUs. The relatively large size of these vessels means that such services operate in



With new arrivals such as the 16,000-TEU capacity CMA-CGM ships, the positive growth the global container fleet has seen since the early to mid-90s is likely to continue

and out of a limited number of CWA ports, which include Abidjan, Lagos, Lomé, Luanda, Pointe-Noire and Tema, primarily due to their 'better' navigable waters. But this also means healthy feeder services are active along this coast to handle this trade. In all, around 119 major container ships operate on these routes - this figure alone makes it the largest market - with a 2,472-TEU average weekly capacity and a total weekly capacity of 29,662 TEU for all services.

As for the companies operating these routes, CMA-CGM and Maersk have the biggest footprint and are responsible for about 60 per cent of the total capacity on the Asia-CWA route between them. Not only do they operate independently of one another, but they also collaborate, operating one service together. CMA-CGM itself runs three services and Maersk Line runs two. Interestingly, Maersk uses its larger capacity vessels for which it is renowned, although with less frequency. The next operator shipping the Asia to West Africa route is PIL, which, with three weekly services operating a capacity of 5,372 TEU accounts for 18 per cent of the route's total capacity. Several other names run this route, also, achieving a healthy trade in and out of CWA from Asia. ■

Tim Guest



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# Fitting out a storage facility in Mauritania

Stodec Trading enables enhanced warehouse efficiency, reducing stock loss, protecting components, and improving staff safety and productivity

**A**n extensive warehouse equipment fit out was completed by Stodec Trading Ltd earlier this year at a major mining site in Mauritania.

A new central warehouse was being constructed to secure and protect the many thousands of essential machinery and vehicle spares ranging from tiny precision bearings to large filter units and including every component for servicing the wide range of engine, equipment, generator, truck and excavating units.

Other essential items such as personnel protection equipment, safety and fire control, IT equipment, manual and power tools also needed secure storage.

Some items needed temperature control whilst in store to maintain their life and effectiveness and other areas were bund protected and fire safe to ensure that inflammable paints and chemicals were properly contained.

The client requirement was not just to get as much storage space as possible it was an essential requirement that every part should be readily accessible quickly to minimise any delay to production and operations when a breakdown occurred.

## Project criteria and preparation

Prior to the fitting out by Stodec Trading all items had been stored either out in the open or in lines of shipping containers spread out across the site. Component damage and deterioration was very high and finding an essential part when needed was often a lengthy and sometimes frustrating search. The lack of proper component warehousing and the ability to implement security, stock control and

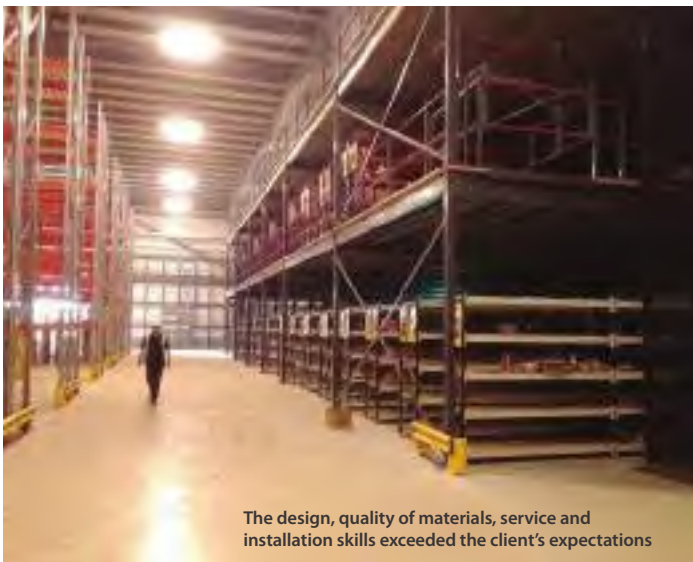
stock selection effectively was a serious and growing problem for production and servicing. Many components would need to be replaced without having been used so component stock wastage was increasing resulting in high unnecessary costs.

The brief to Stodec Trading Ltd was to use their many years of experience in storage equipment layout and design to maximise capacity and to meet the client objectives of access, protection, stock control and warehouse operation efficiency.

The site in Mauritania was remote so Stodec planning had to include consideration of shipping and installation logistics for the storage equipment. A very wide range of different storage systems were used in the installation to ensure that the immense range of components and equipment were most effectively stored.

## The final design included the following:

- A Stodec two tier mezzanine installation of 1400m<sup>2</sup> to provide three levels of storage and effectively increase the warehouse space by using the headroom to the full. The shelving and bulk storage areas on the mezzanine were accessed by stairs, pallet safety gates and by a fully enclosed powered goods lift.
- Dexion Impex steel shelving bays both on and under the mezzanine to provide shelf storage and space for storage bins and trays for small components.
- Dexion Longspan shelving both on and under the mezzanine levels for larger components, gaskets, boxed and odd shaped items.
- Flammable storage cabinets to safely store paints, cleaning and other high risk items within secure cupboard units with their own built in sump to contain spills.
- Dexion Speedlock pallet racking within the main warehouse area giving multi-level pallet storage and using the 8m headroom to the full. Dexion Pallet rack beams were fitted with inset timber shelves to allow for odd pallet size location and to add safety during stock location at high level. The clad beam levels could also be used for boxed stock location and selection by hand at low level.
- Tool storage drawer units with multiple lockable drawers to securely store high value tools, bearings, electronic components etc. The drawers were fitted with adjustable dividers to allow future flexibility.
- Bench units in a range of designs were installed, some for goods receipts and unpacking, some for order fulfilment and re-packing and a central issues counter area.
- Cantilever racking to safely store pipework, machinery shafts and other long components. Medium and heavy duty racks are inside the warehouse serviced with the warehouse fork lifts while heavy



The design, quality of materials, service and installation skills exceeded the client's expectations

- duty galvanised cantilever racks have been provided for external storage with access by the yard fork lifts.
- Spigot racks allow for storage of many varieties of drive belts which are hung from the adjustable spigots so that they retain proper shape even after a long storage period.
- Temperature controlled storage, with an area fully enclosed with insulated steel panels and fitted internally with Dexion shelving to store temperature sensitive parts has been installed with an air conditioning unit fitted by the client.
- Troax mesh partition and stock anti-fall protection has been used in a number of areas.  
On the top mezzanine level mesh screen inside the handrail around the perimeter prevents any stock or personnel from falling.

Stock security is provided in other areas using the mesh partition to create a storage cage and the backs of the 8m high pallet racks area clad with anti-fall mesh where they back onto pedestrian or fork lift travel gangways.

**Project management**

The project required Stodec Trading Ltd to visit the site to understand the customer's requirements and to collect data on the new warehouse design, the products to be used and the issues which would affect delivery and installation.

From this data Stodec Trading Ltd prepared layout and CAD drawings and detailed specifications for a range of alternative storage proposals with guide costings.

Following much discussion and consideration of variations the final design was confirmed and product ordered.



The client requirement was to maximise storage space and that every part should be readily accessible

Stodec Trading Ltd arranged for manufacture of the equipment in the UK and dealt with all consolidation, packing and shipment documentation into containers supplied by the client.

The SEMA qualified team of installers completed the site installation over a ten week period and the complete project was on schedule and on budget providing our client with a first class installation which fully supports their operations.

The design, quality of materials, service and installation skills exceeded the client's needs and expectations. Stodec Trading Ltd were able to demonstrate the value of their many years' experience and the quality of the Dexion storage equipment range. ■

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# Inmesol celebrates 25th anniversary



Spanish generator manufacture celebrates its rise from a small workshop to expansion across 80 countries.

In 1982, a Spanish entrepreneur, José Luis Solano, began designing and manufacturing bedplates, soundproof bodywork and electrical components for generator sets in a small metalwork studio in Corvera, a small village situated 20 km from the city of Murcia in the southeast of Spain.

At the time, Solano's main business was centred on the manufacture and monoblock assembly of the motor and

**INMESOL'S HUMAN CAPITAL IS OUR BEST ASSET: WE WORK SO WE CAN MAKE OUR CLIENTS' PROJECTS GROW"**



Jose Luis Solano, founder and president of Solano Group

alternator for gensets. Now, 33 years later, his business project has evolved into Grupo Solano, whose flagship company is Inmesol.

Inmesol is currently present in more than 80 countries across the five continents, offering a wide range of equipment with the most innovative technology for the most demanding markets, and has a 25 per cent annual growth rate.

#### **2003 MARKS TURNING POINT TOWARDS CONTINUOUS GROWTH**

1987 saw the inauguration of the factory to produce generator sets; however, the main line of business was still the bodywork, which was highly appreciated in the market for its excellent quality. The company continued to specialise in the manufacture of this product until 2003, when it was decided to make a firm commitment to

➤ R&D in order to make a strong entrance into the international generator set market.

Since that time, Inmesol has grown exponentially to become one of the leading manufacturers of generator sets in the world. Over the past quarter of a century, its facilities have also expanded to keep up with the demands of the increase in the volume of business; its installations now occupy a surface area of 100,000 sqm.



One of the assembling lines at Inmesol's facilities

#### DESIGNED FOR DEMANDING INDUSTRY SECTORS

Inmesol designs, manufactures and sells highly-technologically advanced generator sets, both in open and soundproofed versions and with power capacities ranging from 2 to 2,500 kVA. The diverse equipment on offer comes in five ranges to provide solutions to any power supply needs their clients may have, regardless of their geographical location or the extreme conditions in which the equipment has to function.

The generator set ranges are: stand-by, portable, industrial, rental and heavy, all of which comply with current regulations on low levels of acoustic and atmospheric gas emissions. Recently, Inmesol was honoured with the 2015 Entreprs Energy Award for providing power to SMEs which work in remote locations by the International Board of Entrepreneurs and Business People.



Rental Range generator on a high speed trailer

#### SUPER-SOUNDPROOF, TRANSPORTABLE AND ECO-FRIENDLY EQUIPMENT

This year Inmesol has presented several new generator set models that incorporate the latest advances developed by its Engineering Department. In May 2015, the company put its new Rental Range 22-550 kVA soundproofed gensets on the market, using Kohler, Volvo Penta and FPT Iveco motors, which all comply with the current strict STAGE IIIA gas emission regulations.

The Rental Range gensets have an upper air vent, a waterproof control panel, reinforced drag points and a design that facilitates

maintenance and cleaning tasks. They are also designed to work at maximum power in severe weather conditions. Another novel feature is the super-soundproof container: unlike the series models, the new gensets have two external silencing modules, one for admission and the other for expulsion. These design features have managed to reduce the gensets' acoustic emissions even further, from the 75 dB(A) at 7m of sound pressure of the standard models in normal conditions to 70 dB(A) at 7m.

The new models are the result of months of research in order to maintain their position as leaders in advanced equipment, which is also environmentally friendly – a commitment that has defined Inmesol's company policy since it was founded and which is translated to all the stages of manufacture, transport and operational life.

The generator sets incorporate the most modern, low-emission motors; the alternators are mounted with the utmost efficiency; the chassis and bodywork are made using pickled sheets; they work with pre-cut metal sheets to reduce both the number of journeys to and from the factory and the waste to be recycled; and the punching and bending of the steel sheets in profile is mechanised, while the welding is optimised by the use of robots.

On the assembly line, most of the work is carried out manually. A controlled powder painting system is used, which reduces the environmental impact, while dilutions and liquids are drying. There are also constant improvements made to the generator set and pallet design in order to optimise the space in lorries and containers during transportation.



A heavy range generator in a super-soundproof container

Also notable among the latest products presented by the company are models that can be monitored and controlled remotely from anywhere in the world via mobile devices (such as tablets, mobile phones and computers). This technology greatly simplifies the maintenance tasks performed by the personnel responsible for the equipment, allowing them to visualise the control panel in real time and interact with it remotely at any time, with the same efficiency as if they were in the same place, producing significant savings on time and travel costs.

#### INTELLIGENT AND TRANSPORTABLE LIGHTING TOWERS

Another Inmesol line of business is the manufacture and commercialisation of lighting towers. These lighting towers have been designed so that they can be transported quickly on roads and motorways during emergency situations that require greater illumination in a specific area or an additional electrical power source.

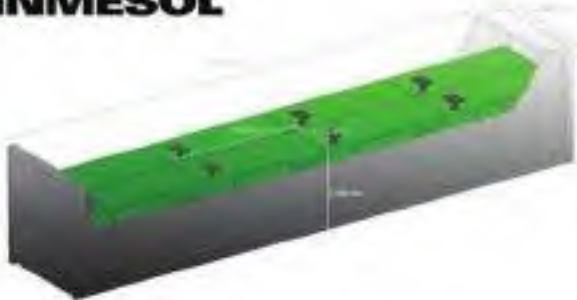
Among the many models available, the Mobile Kit is worth special mention: it comprises a tower and a generator set that



have been prepared in such a way as to be hitched and towed in compliance with all the relevant regulations.

The towers are environmentally friendly as they use LED lamps that substantially reduce the diesel consumption, meaning that the equipment, besides providing energy for the spotlights, can be used to supply other auxiliary charges.

In late 2014, the company launched another model with LED lighting that, instead of using a generator set as a power supply source, has been designed so that it can be connected to either the power grid or autonomous equipment.



An infographic demonstrating how Inmesol optimises the load capacity of generator set containers

Integrated in the towers are a 220 V clock to programme the lighting to come on at a certain time, a twilight relay (light sensor) that activates the spotlights when the sun sets and turns them off at daybreak, and a motion detector that triggers the lights when any movement is detected within a 280° angle around the tower. Likewise, the model is designed so that it can be connected to other towers and operate in a series. To facilitate handling and transport, the towers have wheels and a handle, and the lamps are easily disassembled. The “autonomous” towers, like other products developed by the company, respond to a common demand among many of Inmesol’s clients, as they are designed to facilitate and multiply their use.

#### INMESOL AT THE SOCHI 2014 WINTER OLYMPICS

Inmesol generator sets are manufactured with top quality materials: the steel used for the bodywork and chassis and the laminated carbon steel in the structure are both DD11 according to EN 10111:2008, for example. The joints are welded using robotic MIG-MAG technology and the Qualicoat paint used on the equipment prevents corrosion in saline and humid environments.

Another key component of Inmesol generator sets are the control switchboards, which undergo constant improvements as new technological advances become available to facilitate equipment monitoring or event and alarm programming. Moreover, to ‘arm’ them against any eventuality, they include functions to protect the motor and automatic monitoring for anomalies which may occur in the current, voltage, frequency, speed, oil pressure and levels, the motor, fuel and coolant levels.

Likewise, alarms can be configured for the oil level and temperature, the coolant level or to stop the generator set when it functions outside certain parameters. The equipment is also designed to be towed and lifted securely and stably. Inmesol has specially designed mobile kits to transport the gensets by road or around building sites, for example.

In addition to its advanced production lines, are its demanding quality control processes and its excellent post-sales service. All

of these characteristics have inspired confidence in Inmesol technology in companies around the world. Its equipment is used to supply power in public works, hotels, ports, military facilities, hospitals, large concerts, mines and airports, whether as a main power source where there is no electricity grid available or to provide full emergency power when there is a failure in the grid.

A clear example of how far the company has developed over the past 25 years is the trust placed in Inmesol to supply generator sets to construction companies contracted to build the infrastructure for the 2014 Winter Olympics in Sochi.

Inmesol equipment supplied power during the construction phase of the Olympic Park and stand-by generator sets were installed in the oval Olympic skating centre and the data centre.

“Inmesol’s trajectory has been marked by the commitment to excellence, a commitment which is shared by all the personnel who form part of the company and which is manifested in their attitude and ability to add value to projects and to facilitate their progress,” says José Luis Solano, when commenting on Inmesol’s work at Sochi and other recent projects, which have consolidated the company’s leading position in growth sectors such as telecommunications since 2013.



A containerised generator being exported

#### INNOVATION, HUMAN CAPITAL AND EXPORTS

To the president and founder of the company, Inmesol is the result of his view of life and work – the paradigms of which make up its business culture.

Instead of settling into a comfort zone, new challenges are continuously set. This ability to enter new territory and a vocation for service permeates the entire organisation. Continuous staff training and research translate into a great capacity for innovation and excellent technical advice for clients.

“Inmesol’s human capital is our best asset: we work so we can make our clients’ projects grow,” says Jesús Fernández Cano, the company’s financial director. This philosophy acts as internal engine and is precisely what has opened the doors to international markets and enabled the company to grow in times of crisis.

In the past five years, Inmesol has increased production by 100 per cent, its network of distributors and clients has grown by 50 per cent and it currently exports 96 per cent of its production output.

“Over the past three years we have expanded our technical engineering workforce by 100 per cent to further strengthen our post-sales service,” adds Cano.

With a solid presence in countries in the Middle East, Africa, Europe and South America, its target for the next five years is to expand its distribution network to more than 120 countries and to maintain and improve its competitiveness. ■

[www.inmesol.com](http://www.inmesol.com)

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# Genset power still vital for economic growth

There is a surge in power demand in the continent which, in turn, is leading to a rise in diesel gensets demand and global reports suggest that the boom is just beginning

**N**igeria is facing a major power crisis. This is a direct result of insufficient power generated by the Power Holding Company of Nigeria (PHCN). The crisis, coupled with high economic growth in the country, is the main factor driving growth in the diesel genset market. High demand for gensets is coming from industries across the board. The Nigerian genset market is, therefore, entering a period of steady growth, according to reports.

“Growth in the Nigerian genset market will be driven by the expansion of the telecommunications sector. Telecommunications are among the fastest growing end user sectors of gensets in the country even as other end users such as manufacturing, commercial, construction and oil and gas sectors register strong growth,” Research and Markets noted.

In 2014, Nigeria imported a total of 28,678 genset units totalling to US\$185.5mn, as per data provided by [www.powergen-statistics.com](http://www.powergen-statistics.com). Telecommunications and infrastructure development, road constructions as well as expansion of industries have led to increase in the use of gensets. They are projected to remain as important sources of prime power during the medium and long-terms, despite the major power plant construction projects underway and research on alternative energy sources like renewables.

A key issue is the absence of quality control regulations in the region. This is proving to be the major challenge for original equipment manufacturers (OEMs). The market is flooded with gensets of varying quality and, hence, varying prices as a direct result of the lack of quality control regulations in Nigeria. As the demand for gensets is set to gradually rise in parallel with the country’s economic growth, more equipment suppliers are entering the market.



The 4-stroke Volvo diesel generator has an output of 250KW

“Product quality and efficient after-sales services are fast replacing product price as the key differentiating factors in the genset market,” advises the analyst. “Equipment suppliers that can ensure efficient service delivery, product quality and cost competitiveness are in a better position to capture and increase their market share.”

Meanwhile, import of generator sets in Nigeria is forecast to see growth rates of 8.7 per cent driving up market volume from US\$450mn in 2011 to reach US\$950.7mn by 2020, global research firm GBI Research indicates. Aman Madhok, energy analyst at GBI Research, said, “Sustained growth is driven by increasing electricity consumption, which has been growing at eight per cent per annum over recent years, and the inability of the Power Holding Company of Nigeria (PHCN) to supply adequate power to meet demand.”

Mr Madhok stated that Nigeria is seen as providing a profitable market for

manufacturers of generator sets, especially with imports of the products increasingly coming from China and the UK. He remarked, “The Nigerian market provides considerable opportunities for generator set manufacturers, with good growth recorded between 2006 and 2011, although it experienced a slight decline in 2009 after reaching a peak of US\$411.8mn in 2008.

“The extent of market growth for gas generator sets in Nigeria depends upon the timely implementation of a gas infrastructure in the country.”

According to the report in 2007, only around 15 of the 79 power stations in Nigeria were fully functioning, disclosing that most of the power stations were built in the 1970s and 1980s. The report also mentioned that low gas prices and an abundance of available gas are two major drivers for gas generator sets in Nigeria, adding, however, that a lack of adequate gas infrastructure in the country acts as a major hindrance for gas generator



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sets in Nigeria. It added that despite the fact that the use of gas generators is on the rise, the Nigerian generator set market is still dominated by diesel generators.

Mr Madhok noted that gas generators currently contribute only a fraction of market total revenues in the Nigerian market.

"Nigeria's genset market grew at a CAGR of 5.6 per cent between 2006 and 2011, reaching US\$450mn, despite experiencing a slight decline in 2009 due to the global economic recession. Growth of the market, however, improved in 2010 and 2011," he added.

The genset market also continues to grow in East Africa as the current demand for electricity in Kenya, Uganda and Tanzania far outstrips supply, a large market for diesel gensets exists in these countries. Continuing economic and population growth will only increase the demand for power. Thus, companies that can supply effective diesel gensets, which can ensure stable electricity supply, will gain market share.

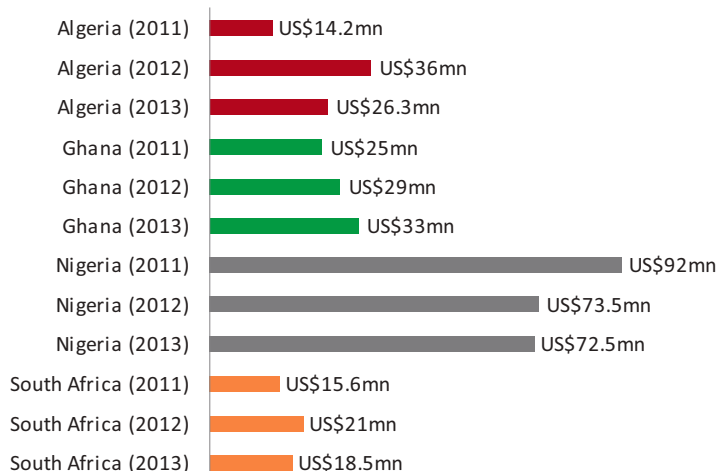
Despite the discovery of gas in the region, manufacturers and distributors of heavy duty generators are optimistic about their business in the region, where they made over US\$300mn in 2014. However, a new analysis of the industry in Kenya, Uganda and Tanzania calls for changes in the way this sector's business is done.

"The recent discovery of gas fields in East Africa is generating interest in using gas as an electricity feedstock instead of diesel. Since the running costs of gas generators are lower than diesel generators, market participants stand to be increasingly affected by this development," research firm Frost & Sullivan indicates. Additionally, an increasing number of suppliers distributing low-quality, cheap diesel gensets that perform poorly and frequently breakdown have damaged the reputation of providers. Further, the insufficient skills of technicians often leads them select incorrect diesel gensets for given applications. As a result, the equipment does not function properly or fails, breeding mistrust for suppliers.

Even then, Frost & Sullivan sees more opportunities until the turn of this decade - mostly in Tanzania, where some 1.5mn cu/m of gas has been discovered.

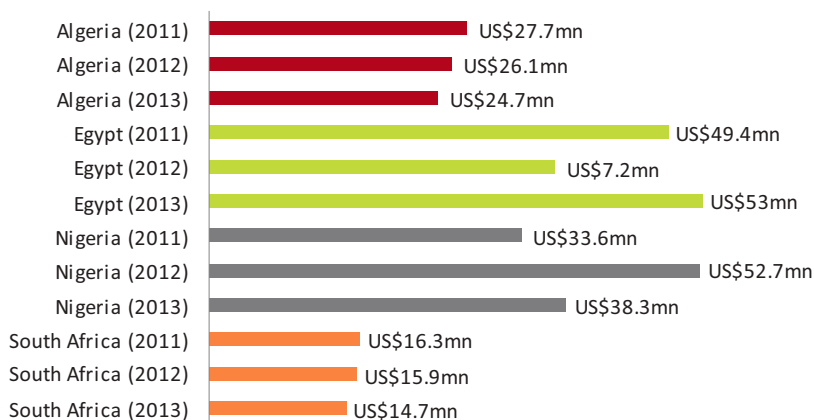
Frost & Sullivan added that the majority of users, considered in its study, purchase diesel gensets for use in standby operations. However, due to the frequent power failures, the gensets are used much of the year by mostly utility firms, oil and gas companies, manufacturers, contractors and mines. "The genset power market in East Africa is not well developed. A majority of users are not aware of this type of service or the benefits

### Import to top African nations



Diesel genset range with output <75 kVA

### Import to top African nations



Diesel genset range with output 75-375 kVA

associated with it," noted the company, which provides market research and analysis, and corporate training services.

Analysis from Frost & Sullivan reveals that Kenya, Uganda and Tanzania markets earned revenues of US\$134.7mn, US\$44.5mn and US\$145.1mn respectively in 2014. By 2018, however, revenues generated by diesel gensets in these markets are estimated to hit US\$168.5mn, US\$65.4mn and US\$220.1mn.

**“ The global generator market is forecast to total US\$22bn by 2019 with growth expected to reach a CAGR of six per cent until 2019**

#### Lacking a customer base

The company lists three major business constraints in the region: Lack of technical skills, high initial cost and cheap products from East Africa that create negative perceptions of quality.

"Additionally, an increasing number of suppliers distributing low-quality, cheap diesel gensets that perform poorly and frequently break down have damaged the reputation of providers," said the company's energy and environmental industry analyst Muneera Salie. "The exploitation of gas finds in East Africa is set to fundamentally change the electricity landscape. Diesel genset manufacturers should consider adding gas gensets to their product offering."

Reports have also suggested that the global diesel gensets market has experienced continually strong growth in the past, with the generators costing little to install but requiring high amounts of fuel to run



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consistently. Due to the ever-growing need for businesses to use a reliable power supply, the global generator market is forecast to total US\$22bn by 2019 with growth expected to reach a CAGR of six per cent until 2019.

Kenya Power and Lighting Company (KPLC), state-owned power utility, represents 97 per cent of the rented power market in the country. Since severe droughts have limited the capacity of hydro-powered plants, KPLC has been forced to rely on genset rentals.

"In Uganda, widespread power shortages have led to an average of five hours of load shedding per week, forcing companies located here to adopt diesel gensets," said Frost & Sullivan energy & environmental industry analyst Muneera Salie. "Businesses want to maintain uninterrupted production, and this presents robust opportunities for diesel genset suppliers."

With Tanzania having pursued a policy of institutional reform in order to attract FDI, the country has been seeing a growing need for

**“As the energy infrastructure in developing countries remains poor on the whole it is expected that generators will be required for the foreseeable future**

diesel gensets. One of the major forms of institutional reform, which has occurred is the large-scale drive towards privatisation of state enterprises — thus far, approximately half of the 400 *parastatals* have been privatised. This has resulted in resources being allocated more efficiently, in turn lowering the costs of doing business and fuelling the demand for diesel gensets.

"Within these circumstances, many customers have quite naturally remained loyal to a brand, which they have used before or which has been in the country for many years," noted Salie. "For brands that have not yet established themselves, an effective strategy to build trust and establish strong client relationships is necessary to obtain market share."

For instance, offering more effective after-sales services will help emerging brands grow as many end users rated this as an important factor influencing their purchasing decisions. Providing technical advice is another way brands could differentiate themselves from the competition.

#### Continued growth in genset markets

Based on output power, diesel gensets are broadly classified under low power (below 75kVA), medium power (75.1kVA to 350kVA), high power (350.1kVA to 750kVA) and very high power (750.1kVA to 2,000kVA) categories.

The sales of products in the global generator market have been particularly strong in regions which have an unreliable electricity supply, such as countries in Africa and Asia. There have recently been a large number of power cuts across South Africa and Ghana, which have greatly affected both businesses and individuals operating in these countries. South Africa has been particularly badly affected by power shortages in recent months, with South African electric public utility Eskom announcing plans for rolling blackouts in order to undertake repair work on several of their damaged generators.

"We're having to do a lot of maintenance on our generating units and some of them have unfortunately broken down this week so we will be doing a lot of work over the weekend in a bid to catch up so that we are in a much better position than we are now," said Eskom spokesperson Khulu Phasiwe.

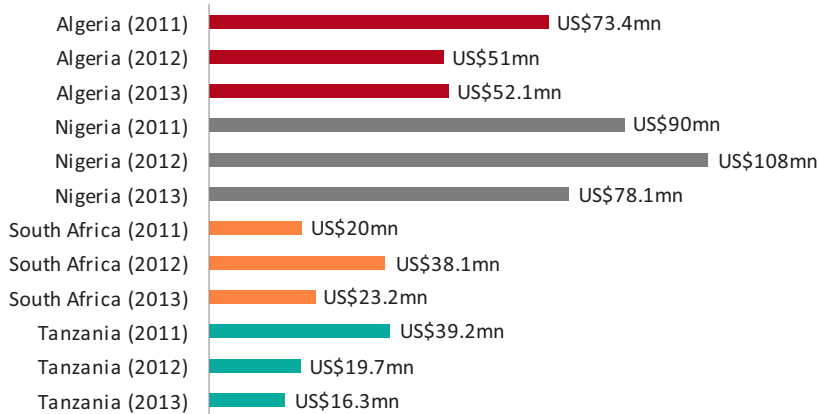
Eskom have admitted that the rolling blackouts are expected to hamper retail companies in South Africa and have asked South Africans to conserve energy during peak times, so that the strain on the power grid is minimised.

"Eskom say they have got five out of six generators working and that one generator is down for maintenance," according to energy expert Chris Yelland.

"Which is good, it means that they have made a plan. An emergency plan, but they haven't started repairing the silo. All they've done is they've got a work around," Yelland noted.

The global generator market is seeing a rise in adverse weather conditions and new and improved generator technologies boost its

#### Import to top African nations



Diesel genset range with output >375 kVA

#### Highest genset imports in 2014



Diesel genset range with output <75 kVA

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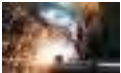
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➤ growth prospects. As the energy infrastructure in developing countries remains poor on the whole it is expected that generators will be required for the foreseeable future.

#### The rise of natural gas gensets

Natural gas (NG) generator sets (gensets) are reciprocating internal combustion engines that are used worldwide for distributed power production. Despite a short-term slowdown due to volatility in the oil and gas market, the NG genset market is expected to show healthy growth during the next 10 years. As a source of emergency standby, prime, peaking, or continuous power, NG-fuelled gensets are poised for rapid growth, particularly in markets where inexpensive NG is widely available.

Yet, NG gensets cannot match the performance or convenience of diesel gensets since diesel has a higher energy content and is easier to transport than NG. Today, though, the line between NG and diesel gensets is becoming blurred with the increasing popularity of dual-fuel gensets, which offer the performance of diesel while taking advantage of the low price and low emissions of NG. In emerging economies, the key obstacle to the spread of NG gensets is a lack of adequate NG infrastructure. Once again, dual-fuel gensets provide an interesting middle ground, and they are seeing growth markets in developing countries where the NG infrastructure is expected to follow. According to Navigant Research, annual NG genset installations are expected to reach 27.2GW by 2024 and generate US\$146.8bn in cumulative revenue between 2015 and 2024.

Annual natural gas (NG) genset installations are expected to reach 27.2GW by 2024 and generate US\$146.8bn in cumulative revenue between 2015 and 2024, according to a report published by Navigant Research.

NG gensets consist of an electric generator coupled with a natural gas-powered prime mover - a reciprocating internal combustion engine (RICE). While NG gensets are not a new technology, they are part of a complex

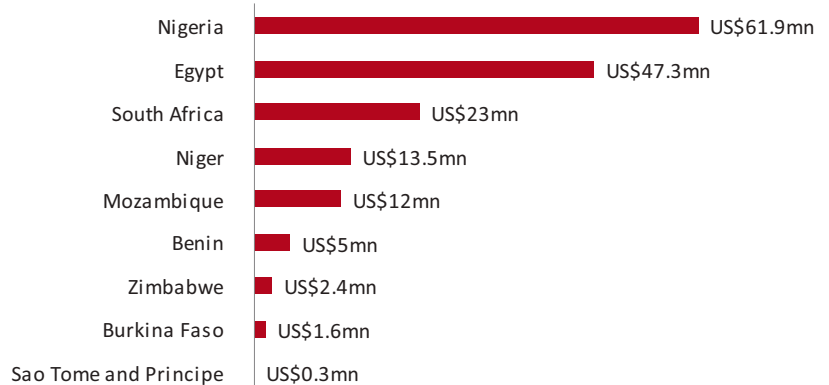
**“ In emerging economies like African nations, the key obstacle to the spread of NG gensets is a lack of adequate NG infrastructure**

#### Highest genset imports in 2014



Diesel genset range with output 75-375 kVA

#### Highest genset imports in 2014



Diesel genset range with output >375 kVA

market that is seeing significant changes and growth opportunities. NG gensets are currently the engine of choice for the higher duty cycle stationary power market. They are also gaining ground in backup or standby applications.

The global NG genset market has grown 10 per cent annually over the past three to five years. Since 2014, growth has flattened in response to the drop in oil prices. Global growth rates for aggregate RICE genset sales will likely be between three to seven per cent annually over the next five to 10 years.

Despite the fact that NG gensets have higher maintenance requirements than other prime movers and cannot match the performance of diesel gensets in terms of power output per unit of displacement, they are expected to outpace their diesel and gasoline counterparts. With the increasing popularity of dual-fuel gensets, which offer the performance of diesel while taking advantage of the low price and low emissions of NG, the line between diesel and NG gensets is becoming blurred. In emerging

economies, the key obstacle to the spread of NG gensets is a lack of adequate NG infrastructure.

Asia-Pacific is expected to lead all regions in capacity instalments through 2024, and China is expected to surpass the USA in annual installed capacity by 2023. North America is projected to experience strong growth, benefiting from an enormous domestic supply of cheap NG and stricter regulations on emissions. Europe, due to its sheer size, and the Middle East, due to strong growth, offer lucrative opportunities for NG gensets as well. Collectively, these regions are expected to account for 91 per cent of global capacity instalments in 2024. Although Latin America and Africa remain relatively immature markets for NG gensets, both regions are expected to benefit over the long-term from expanding natural gas infrastructure. Africa is projected to be the second-fastest growth market behind Asia-Pacific.

Over the last three years, gas powered generator sets have risen in prominence in Europe and the USA due to stricter emission



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laws and lower gas prices. The shale gas boom in the USA and increasing adoption of biogas in Europe have kept the gas gensets market in the two regions buoyant while liberalisation has given a leg up to the market in emerging countries. In fact, China and India have become the largest production hubs for gensets with many large manufacturers building their capabilities organically or through tie-ups and alliances.

Frost & Sullivan finds that the global gas genset market earned revenues of US\$4.14bn in 2013 and estimates this to reach US\$8.59bn in 2019. The study covers the end-user segments of residential, commercial and industrial.

Gas gensets easily comply with environmental regulations by producing greater amounts of electricity through highly efficient, decentralised natural gas combined heat and power (CHP) systems. Gas property as a clean burning fuel coupled with genset advantages such as lower noise, quicker permit obtention, and reduced capital costs make gas gensets the ideal choice for end users across segments.

"The surge in natural gas availability and improved infrastructure for delivery has lowered the price of gas, greatly assisting the sales of gas gensets in developed regions," Frost & Sullivan energy industry analyst Pritil Gunjan said. "Though technological improvements, such as the automatic control system, are making gas gensets 50 per cent more expensive than their diesel counterparts, their reliability and lower lifecycle costs will keep demand high."

This is especially so in emerging countries like in East Africa, which do not have access to adequate reserves of gas and lack the necessary infrastructure to pipe gas from other regions. The widening demand and supply power gap will escalate gas gensets as a source of prime and continuous power. In



The genset business contributes 40 per cent of Kirloskar Oil Engine Limited's total turnover

this scenario, highly flexible generating units with fast response times can provide utilities with a flexible power generation infrastructure, allowing them to make the most of the high electricity prices during hours of peak demand.

"Gas-fired gensets, with their low-risk technology, favourable capital costs, and higher efficiency have become the technology of choice for intermediate load and increasingly, for base load power generation," Gunjan added. "Effective policies and regulatory frameworks, natural gas availability, and high consumer awareness will further fuel the growth of the gas genset market."

#### Africa a big market

Research by PriceWaterhouseCoopers indicates that worldwide spending in infrastructure will double between now and 2020. This expenditure should grow at between six and seven per cent per year over

the next ten years, with faster growth in sub-Saharan Africa estimated at an excess of 10 per cent per year.

Poor power infrastructure and unreliable grid power supply have been largely responsible for increasing frequency of power outages, which is likely to boost demand for diesel gensets in the continent. Therefore, it can safely be said that Africa is the 'market of choice' for genset manufacturers.

The key market players, which includes manufacturers as well as service providers, are Caterpillar Inc. (USA), Cummins (USA), Aggreko Plc. (UK), APR Energy Inc. (USA), Kohler (USA), MQ Power Corporation (USA), Generac Holdings Inc. (USA), MTU Onsite Energy Corp. (Germany), Yanmar Co. Ltd. (Japan), Wacker Neuson S.E. (Germany), Himoina S.L. (Spain), and Kirloskar Electric Company Limited (India). ■

Graph source: UN Comtrade, PowerGen Statistics



## Choosing the most suitable genset

South African portable compressed air and power generation rental company Rand-Air offers a few key tips when considering the rental of a portable power generator.

The first factor to consider is making sure the generator meets the power needs of the user. "In addition to meeting energy requirements, understanding the parameters of the power needs will help identify which genset equipment will best suit the situation," said Lukas Hopley, service manager of Rand-Air.

Hopley said, "Hiring a generator that is undersized when the power requirements of the job are greater than the capacity of the machine, means that the generator will either shut down or trip the circuit breaker."

"An undersized generator will also slow down the engine by pulling too much horsepower, the voltage and frequency output will become unstable and can result in the damage of the equipment connected to the generator", Rand-Air said in a company statement.

According to Hopley, "An oversized generator is when less than 50 per cent of the rated capacity is used. If the generator is not producing the required horsepower to reach the rated capacity, it can cause it to glaze."

Rand-Air fleet manager Craig Swart explained, "It is important to size the generator correctly for the application, and to only use a qualified electrician when connecting the generator to the application."

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# Qatar's Losail lit up by Volvo Penta engines

Volvo Penta works with Pramac to ensure excellent continuous power supply and efficient energy at QMMF event in Doha

The Losail International Circuit in Doha, Qatar, is home to some of the world's most exciting sporting events. And putting the power behind Losail's renowned, high-octane night time races is Volvo Penta. As night falls, Losail comes to life lit up by 3,600 floodlights that are provided power by Pramac gensets.

In 2006, Pramac - one of Volvo Penta's global OEMs - won a bid to supply the circuit with 44 generators. This year, in a successful contract renewal with the Qatar Motor & Motorcycle Federation (QMMF), Pramac will replace the old generators, consisting of Volvo Penta TAD941GE engines, with new units installed with Volvo Penta TAD1342GE engines.

With Qatar's daytime heat hazardous to customised, multi-million dollar motorcycles, the Losail International Circuit became home to the world's first MotoGP nighttime race.

## Cool under pressure

"After receiving positive feedback about our last set of Volvo Penta-powered generators, which were installed at Losail in 2006, we wanted to provide QMMF with units that were equal in quality and performance," said Francesco Napoli, marketing manager at Pramac. In recent years, Pramac has become an international leader in energy supply to the sporting world, due to its innovative, dynamic designs and proven experience for complex energy plants, according to company sources.

"The durability, reliability and fuel consumption of the Volvo Penta TAD1342GE engines make them ideal for use in Pramac's 44 diesel generators, which can each produce 330kVA."

The generators can also create around 11MW of energy collectively, powering more than 3,600 floodlights and other light fixtures around the circuit.

Given the blistering temperatures in Qatar, Pramac required an engine that could operate effectively in intense heat. Volvo Penta's

TAD1342GE is equipped with piston cooling, a belt-driven coolant pump and a water distribution duct, all designed to maintain a controlled working temperature in the cylinders and combustion chambers. Each generator is also fitted with sand trap filters to guard against desert storms.

"Volvo Penta supplies more than 1,000 engines a year to Pramac, which has production factories in Italy, Spain, China and Brazil,"

noted Renato Deda, Volvo Penta industrial sales manager for Italy and Spain.

"We are proud to support Pramac's continued cooperation with MotoGP"

Francesco added, "Volvo Penta's quality, flexibility and excellent after sales support are second-to-none; Losail is an important contract for Pramac, but with a business partnership reaching back 20 years, we knew we could trust Volvo Penta." ■



Pramac's 44 GSW diesel generators can generate 330kVA each, powered by Volvo Penta engines



The Losail International Circuit in Doha, which is lit by 44 Volvo Penta-powered Pramac gensets

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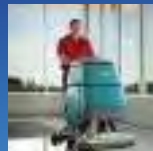
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# The gains to be made from cogeneration

The technologies and benefits of CHP and CCHP deployment, which are being promoted heavily by South African organisations

According to the South African National Energy Development Institute (SANEDI), the combined generation of heat and power can save more than 30 per cent of primary energy and CO<sub>2</sub> emissions. Co/tri-Generation has the potential to contribute effectively and significantly to South Africa's energy policy objectives in terms of energy efficiency and climate protection. Cogeneration plants operate with significantly higher efficiencies and thus contribute positively to environmental requirements. Moreover, cogeneration plants contribute significantly to CO<sub>2</sub> emissions reduction. And cogeneration has the potential to strengthen companies' power independence and competitiveness. For this reason, the South African-German Energy Programme (SAGEN) supports the set up of a Facilitator for Energy Service Companies (ESCO) and SANEDI to inform stakeholders on the benefits of cogeneration technology - by establishing networks, conducting workshops and disseminating information. ESCo and SANEDI aim to improve understanding of cogeneration in South Africa, and also to highlight good practices to improve the investment potential of one of today's most promising energy efficiency technologies.

## Co/tri-generation technology

The simultaneous production of more than one type of energy from a single fuel source, co/tri-generation technology enables the production of heat and power at the same time - in a process also referred to as combined heat and power (CHP). The additional production of cold - as well as electricity and heat - is called trigeneration or combined cooling, heat and power (CCHP). Heating and cooling output may operate concurrently or alternately depending on need and system design. Co/tri-generation units can be based on steam turbines, gas turbines, combined cycle steam/gas turbines or reciprocating internal combustion engines.

The most common way of producing electricity is using a Rankine cycle, by which fuel is burned in a boiler to produce thermal energy and to heat up water, gas or another 'working fluid'. In this way, the working fluid is pressurised, and can take more energy as it becomes 'superheated', then expanding through a turbine to generate electrical power. A typical power plant produces electricity alone, as any gaseous working fluid is condensed into a liquid after exiting the turbine, before the Rankine cycle recommences. A key advantage of using steam turbines for combined heat and power production is that any fuel can be used. The steam that drives the turbine is produced in a typical industrial boiler, which can be modified easily to burn almost any type of fuel - including waste fuels such as pulping liquor, landfill gas, and biomass. Steam turbines are the only technology that can use energy from by-products like process heat from heat recovery boilers.

Some thermal energy, or waste heat, is lost during production. Co/tri-generation processes waste energy, to be used as process steam or steam for residential heating/cooling systems. So, a higher percentage of the energy source, or fuel, is used to generate energy in different forms - for example, as electricity, heat at a relatively low temperature for heating processes or as heat at a relatively high temperature for industrial processes. Depending on the sequence of energy types generated, cogeneration systems can be referred to in terms of topping or bottoming cycles.

In a topping cycle, the fuel supplied is used first to produce power and then to make thermal energy as the by-product of the cycle. Topping cycle cogeneration is widely used; in fact, it is the most popular form of cogeneration globally. In bottoming cycles in comparison, the primary energy production is thermal energy, while only the waste heat is used to generate power.

Bottoming cycles are mainly used by industrial companies requiring a large amount of process steam - including the cement and petrochemical industries. The rejected waste heat still has a relatively high temperature after usage, so it can generate electricity in recovery boilers and/or turbines without difficulty.

## Production plants and processes

Cogeneration plants can range in size from as small as 1kW up to 1,000MW. The smallest plants, called microcogeneration plants, are based on sterling motors, which are used in domestic heating applications and have an electrical output of 1-3kW and a thermal output of approximately 20kW. Motor-operated cogeneration plants range from 5kWel/30kWth up to 10MWel/10MWth, and work with a variety of heat sources.

Simple process systems come with a gas turbine and a heat recovery steam generator (HRSG). More sophisticated systems comprise gas turbines, HRSG and steam turbines. Advanced systems such as 1,000MWel combined-cycle plants offer 61 per cent efficiency and fuel efficiency of up to 93 per cent.

For solid fuels, boilers can come with the full set of steam turbines. Typical plants start at 1MW, but large plants can be 1,000MW super-critical units with heat extraction. Furthermore, cogeneration plants can be divided into three groups: heat-producing plants with electricity as a by-product; electricity-producing plants with heat as a by-product; and flexible plants meeting the demand of heat and electricity consumers.

Heat-producing plants, which offer electricity as a by-product, control the heat output of the plant in relation to the demand of heat consumers. Depending on the type of plant, electricity is produced proportional to the heat demand or electricity production is reduced or increased to follow varying heat demand. Proportional production is typical for gas turbines with HRSG. Heat

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output is controlled by fuel input to the gas turbine. Electricity production is proportional to heat demand. Those plants where electricity production varies with varying heat demand tend to utilise a condensing turbine in parallel to the heat consumers. Rising heat demand will reduce electricity production and vice-versa.

Electricity-producing plants producing heat as a by-product will see electricity output controlled and following the electricity demand of the electric grid. Heat will be produced proportional to electricity demand or heat production may be reduced or increased to follow varying electricity demand. The latter is typical for production based on an uncontrolled heat source, such as a solar-thermal field or waste heat from a process, feeding a steam turbine with controlled heat extraction. With constant heat production, varying electricity demand will yield varying heat supply.

The system designs underpinning flexible plants meeting both the demand of heat and electricity consumers are prioritised to consumer requirements. A typical plant comprises one or several steam boilers, often with different fuels capable of meeting steam and electricity demand. The steam boilers

usually supply a steam header feeding a cascade of back-pressure steam turbines and condensing turbines. Heat and electricity demand will be met by changing heat production from the boilers utilising steam storage properties of the steam headers. Exceptionally, one may require a single boiler with an extraction condensing type turbine. A key consideration is that a cogeneration system is able to adjust to site-specific requirements. Factors to be considered include: electrical base load matching; thermal base load matching; electrical load matching; and thermal load matching.

#### Configuring to meet demand

The electrical base load matching configuration entails the cogeneration plant being sized to meet a site's minimum electricity demand based on the historical demand curve. Any additional power required is purchased from the utility. The thermal energy requirement of the site could be met by the cogeneration system alone or by additional boilers. If the thermal energy generated with the base electrical load exceeds demand, excess thermal energy may be exported.

With a thermal base load matching configuration, the cogeneration system is

sized to supply the minimum thermal energy requirement of the site. Standby boilers or burners are operated during periods when the demand for heat is higher. The principal generating unit (or prime mover) operates at full load at all times. If demand exceeds that which can be provided by the prime mover, additional energy may be purchased from the grid. By return, any excess electricity can be sold to the local power utility.

Electrical load matching schemes entail use of facilities that are totally independent of the grid, as a 'stand-alone' system. A site's entire power requirements are to be built into the systems design and sizing considerations. In such a scheme, if a site's thermal energy demand is higher than that generated by the system, auxiliary boilers may be used. When thermal energy demand is low, some of the energy will be wasted.

Thermal load matching cogeneration meets the thermal energy requirements of a site at any time. In this scheme, prime movers are operated following thermal demand. During the period when the electricity demand exceeds generation capacity, power will be purchased from the grid. By return, electricity produced in excess of demand may be sold.

## Cogeneration creating its space in Africa

With the focus on ensuring stable supplies of power in many African countries, the benefits of maximising fuel efficiency are often overlooked. Fuel costs have increased over the decades and the need to maximise scarce resources means that cogeneration or combined heat and power (CHP) technology is now getting the recognition it deserves.

Cogeneration maximises the energy in a fuel by utilising not only the electricity that is produced by the generator but also the surplus heat for localised use. About 45 per cent of the energy in the fuel is converted to electricity, with 45 per cent being converted to heat — either in the form of hot water, steam or hot air for drying. If both heat and electricity are fully recovered the total fuel efficiency is about 90 per cent meaning fuel, cost and carbon savings for the end user.

This technology can be developed further if some of the heat is used to create cooling water, through absorption chiller technology. This trigeneration system, which is also called combined cooling and power, can be deployed in refrigeration and air conditioning systems.

CHP is also a form of distributed power generation. Many developed countries outside the African continent have historically relied on large centralised power plants that garner significant investment in transmission and distribution infrastructure. The

inability to use all of the energy in the fuel at source, along with transmission losses means that many countries are moving towards distributed power generation. The African continent has the

opportunity to develop its power generation network in different manner with a more distributed power generation system in order to give more efficient, reliable electricity supplies.

Cogeneration technology is now being deployed across the African continent. Clarke Energy has already supplied GE's Jenbacher gas engine cogeneration systems in Tunisia, Nigeria, Tanzania and South Africa. Applications have included power plants for leading drinks brands, pharmaceutical, telecommunications and food companies. Businesses that have access to supplies of gas or have a

current long-term allocation can use their energy source more efficiently if it is used in a cogeneration unit rather than a boiler. A gas supply of 80,000GJ per annum could provide 1MW of electricity and 1MW of heat for onsite use.

With growing availability of gas on the continent, coupled with unstable domestic power supplies, the market for cogeneration technology is on the up in Africa.

— By Alex Marshall, Clarke Energy



The Tronox Furnace Gas CHP Project at Saldanah Bay in South Africa

### ► Steam systems for power supply

Co/tri-Generation units can be based on either steam turbines, gas turbines, a combined cycle steam/gas turbine system or on reciprocating internal combustion engines. However, the most common way of producing electricity is by using a Rankine cycle, by which fuel is burned in a boiler to produce thermal energy and to heat up a working fluid, which becomes pressurised and 'superheated'. The superheated working fluid expands through a turbine, and electrical power can be generated.

In a power plant solely producing electricity, the gaseous working fluid will be condensed into a liquid after exiting the turbine, and the Rankine cycle starts again.

Only a proportion of the primary energy burned in the boiler can be converted into electricity. After exiting the turbine, the working fluid is present in a gaseous aggregate state, which retains thermal and chemical energy.

The process of condensing the fuel - for example, in a cooling tower - entails significant losses of energy. However, the main benefit of cogeneration based on steam turbines is that any fuel can be used. Steam turbines are very flexible because the steam driving the turbine is produced in a standard industrial

boiler, which can be easily modified to burn virtually any type of fuel - including waste fuels such as pulping liquor, landfill gas, and forest residue. And steam turbines are unique in their capability to use energy from by-products such as process heat from heat recovery boilers.

CHP plants based on steam turbines do feature a relatively high heat to power ratio, so they are used principally where the requirement for heat is higher than that of electricity.

There are, in fact, four types of technology for using steam for on-site thermal energy: backpressure turbines; full-condensing turbines; extraction back pressure turbines; and extraction condensing turbines.

With backpressure turbines, steam flows completely through the turbine and expands until it reaches the required steam pressure. During expansion, electricity is generated. The steam is used in the form of thermal energy at the required pressure.

With full-condensing turbines, the steam flows completely through the turbine and is completely condensed after exhausting. This type of turbine technology is used typically when relatively more electricity is required.

In the case of extraction back pressure

turbines, which are mainly used where thermal energy of different qualities is needed, some of the steam is required at a higher temperature, and a greater pressure level is extracted at an earlier stage from the turbine. The rest flows completely through the turbine and is then used as thermal energy.

Extraction condensing turbines utilise only part of the steam to flow completely through to generate electricity. For purposes requiring higher temperature and more pressurised steam, the steam can be extracted from the turbine at an intermediate point; the rest of the steam will exhaust at the end of the turbine at less pressure and a lower temperature, and then condenses in a surface condenser.

Cogeneration from gas turbines tends to rely on natural gas being burned in a pressurised combustion chamber. However, combining a steam cycle with a gas cycle means more power can be produced compared to the single cycle solution.

However, in combined cycle solutions, reciprocating internal combustion engines also have a high electricity output, as heat can be recovered from exhaust gas or the engine's cooling water. ■

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# Light at the end of the tunnel for energy crisis

Investors are turning to sustainable technologies in South Africa, including concentrated solar plants

The looming threat of load shedding is becoming a regular occurrence in South Africa as a result of a shortfall in coal-generated power supply.

Industrial gases market leader Afrox has been awarded a long-term contract to supply high-purity nitrogen, and liquid petroleum gas (LPG), to the US\$565mn Bokpoort concentrated solar plant (CSP) Project located approximately 125km south-east of Upington. The Bokpoort CSP will boast a 50 MWe generating capacity with nine hours of thermal storage once it is fully commissioned by end-2015.

Afrox business manager for bulk ASU gases, Carte Lubbe explained recently that the company is supplying Bokpoort CSP with a fully-customised turnkey solution unique to the local market. He said, "LPG will be used by the CSP during the start-up phase for melting of salts for the Thermal Energy Storage system, whereby the transfer medium is heated to the point that it transforms from a solid state into a molten state."

The substantial amount of LPG is, however, only required during the heating phase of the

project. As a result, Afrox has designed an innovative modular supply system that will be installed and can be dismantled and removed from site within days, thereby ensuring minimal project disruption.

Lubbe reported, "Following the heating period, the entire LPG supply plant will be removed from site. Similar projects in the past have made use of fixed installations that become redundant after the start-up phase and take up unnecessary space, while costing a fortune to maintain. Upon service completion, our unique modular plant can be removed by a fleet of dedicated and specialised vehicles in under a week – an unrivalled turnaround time."

#### Nitrogen needed for specific supply

Following the heating of the molten salts, a blanketing system is required in order to minimise the risks due to flammable products, as well as minimising the emissions to the atmosphere and to avoid the deterioration of process fluids. For this reason, the plant will include a nitrogen network that will provide an inert

atmosphere to the salt storage tanks, the expansion tanks and the high temperature fluid boiler.

Lubbe remarked that the company has been working together with Bokpoort CSP to develop a nitrogen supply system to meet its specific needs. He said, "As a result of the critical need for nitrogen, special care was taken to ensure that all aspects of demand and supply had been considered. The nitrogen supply system comprises an on-site nitrogen production system, backed up by a high pressure liquid nitrogen storage and supply system."

The on-site nitrogen generating facility is supplied by Afrox's parent, the Linde Group Engineering division, while the cryogenic storage facility and custom designed nitrogen reticulation system is supplied by Afrox. A long-term nitrogen supply agreement between Afrox and Bokpoort CSP has been concluded, ensuring an uninterrupted and reliable nitrogen supply to the project.

Due to the location of Bokpoort CSP, Afrox is able to supply the back-up liquid nitrogen via road from several of its regional operations across South Africa, thus providing even more security in supply.

In addition to using LPG and nitrogen supplied by Afrox, the Bokpoort CSP also made use of the company's extended product range of welding gases, hard goods and consumables during the construction stages. Lubbe said, "Afrox has provided a comprehensive and holistic solution to Bokpoort CSP, which will lead to a long-term and mutually-beneficial partnership."

Afrox is well positioned to support potential future CSP projects with a total solutions offering, having gained an in-depth understanding of the specific requirements, as well as challenges faced by various role players and stakeholders throughout the execution of CSP projects and eventually by the operating entity. ■





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# An integration agenda for sector sustainability

Power-Gen Africa and DistribuTECH Africa connect over 50,000 leading business-to-business power generation professionals

Taking place 15-17 July in Cape Town, South Africa, the 2015 editions of Power-Gen and DistribuTECH Africa offer a combined, co-located showcase of emerging opportunities in the world's fastest-growing market, bringing together over 50,000 regional and international power sector leaders for the most comprehensive event serving Sub-Saharan Africa's electricity sector.

Delegates will have an opportunity to evaluate new solutions in the extensive exhibition areas and join a technical tour of the Palmiet Pumped Storage Scheme in one of the spurs of the Hottentots Holland Mountains. This tour will offer participants a unique opportunity to view a scheme that comprises two new dams and serves not only as a hydro-electric pumped storage scheme, but also as a water transfer scheme.

Nigel Blackaby of event organiser Penwell Corporation notes that, with thousands of attendees expected from across Africa and abroad, networking is a significant bonus at an event of this kind. He said, "Nothing facilitates networking and interaction more than a shared experience, therefore we have partnered with local tour operators to offer delegates access to bespoke tours."

## Experts on integration

Power-Gen 2015's expert advisory board has identified integration of renewable energy into the traditional power ecosystem, universal access to power, and funding and sustainability as key issues to address at Africa's premier power sector event.

The integration of renewable energy into the traditional power ecosystem, universal access to power and funding and sustainability issues are among the top challenges facing sub-Saharan Africa's power generation sector in the short term.

The most crucial issues facing Africa's power sector come under discussion at Power-Gen Africa by the event's Advisory Board includes academics, industry body representatives and experts from a number of African countries, with organisations such as the National Energy Regulator of South Africa (NERSA), the Southern African Alternative Energy Association (SAAEA), Eskom, Renewable Energy and Energy Efficiency Partnership (REEEP), the Lesotho Highlands Water Commission and CEFA Tanzania among its members.

The Advisory Board as already noted that, of the key themes coming to the fore in the African power generation sector, amongst the

most pressing is funding and investment.

With Africa seen as potentially the next big market for independent power producers, questions are arising around regulation, best practice and funding models. In some regions, a cost versus standards debate was emerging as foreign developers entered the African market, they noted.

Renewable energy, which is now seeing strong uptake as the cost of generation drops, is also emerging as a top strategic issue as questions arise around the regulatory environment, integration models and pricing structures, the Board noted. Investors are increasingly looking to projects in Africa, such as the recently-opened 96 megawatt (MW) photovoltaic (PV) Jasper Solar Plant near Kimberley, developed by a consortium including Google, and the 160MW Nour 1 thermo-solar plant scheduled to go live in Morocco in 2016. Meeting growing power demand through strategies such as the liberalisation of markets, government grants and international development initiatives; as well as new models for controlling the cost of power generation were also important issues the sector is facing. Other themes impacting the sector now include the interconnection of regional grids and regional power pools. ■



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# Better bricks for bigger profits

Total solution from PMSA saves Van Dyk Stene up to 30 per cent on the cost of working with cement



The Van Dyk Stene plant in Vredenburg, in South Africa's Western Cape



PMSA supplied a total concrete solution for Van Dyk Stene

The newly commissioned Van Dyk Stene plant in Vredenburg in South Africa's Western Cape is saving the manufacturer up to 30% on its total cement input costs. The plant is a showcase for the total concrete solutions available from Pan Mixers South Africa (PMSA), the continent's largest manufacturer of concrete brick, block and paving machinery.

#### Advanced and automated

Van Dyk Stene is the first plant of its kind in Africa to use a full curing system from German technology leader Kraft Curing, distributed locally by PMSA. The total automated solution supplied covers batching (mixing and weighing), a stacker and destacker, an RE1400 block-making machine and automated wet and dry side product handling. The advanced technology from Kraft Curing allows PMSA's customers to reduce their input costs by cutting down on the quantity of cement used in the production process, without compromising on the quality of the bricks and blocks.

"Van Dyk Stene is now able to achieve the same strength requirements, but with 30 per cent less cement, a cost-saving that will have a significant impact on its bottom line," remarked PMSA sales and marketing manager Quintin Booysen.

#### Consistent and controlled

The Kraft Curing technology allows for consistent control of temperature and relative humidity levels of between 90 and 95 per

cent, improved operational efficiency, high early concrete strength, uniform colour and a denser product surface.

The curing system uses air circulation to maintain temperature and humidity consistency throughout the top and bottom levels of the curing chamber.

Together with increased humidity, this contributes to improved product strength. High early strength means that the end product can be tested and delivered more quickly, thereby reducing stockholding.

Booyesen explained that PMSA specialises in providing total concrete solutions to meet all of its customers' requirements. It was awarded the contract by Van Dyk Stene to supply all of the equipment for the plant, which took nine months from design to final construction, and was opened officially on 20 May 2015.

Van Dyk Stene was established in Vredenburg in 1970. Owned and managed by Mario and Andre van Dyk, the company manufactures and supplies precast masonry products, sand, stone, kerbs, pavers, walls and garden products. Its focus on customer service and high-quality products has made it an industry leader in the Western Cape.

The company has invested heavily in modern production techniques for efficient high-volume output of its extensive product range. As Andre van Dyk observed, "The latest example of our commitment to innovation is the addition of our concrete curing process facility." ■

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# Machines to make flooring perform

How industrial flooring solutions provider AcryliCon completed a flooring project; stripping tiles and tile grouting, rehabilitating concrete surfaces

The project also included the installation of Decor HID a colour-quartz filled, trowel applied coating with extraordinary performance that is ideal for wet or heavily abraded areas where hygiene and cleanliness are required. The system also incorporated Microban an antimicrobial product that inhibits the growth of microbes such as bacteria and mould that can cause stains, odours and deterioration of the floor.

Diamond Products a leading specialist in the manufacture, of diamond tools and sole distributor of the Diamatic range of flooring equipment for industrial applications supplied and supported AcryliCon with the specialist equipment used in the five-week project, which began in January 2015 and involved five teams of trained AcryliCon operators.

Makita electric breakers were used to remove this mass of tiles and tile mortar. After

the tiles were stripped, a scarifying machine was used to plane surfaces. Thereafter the Diamatic 435 grinder was used to grind down the profile of the floor and achieve a suitable bond key.

The Diamatic 435 grinder weighs 115kg, and has a working speed of 720rpm, with a working width of 435mm in diameter. This machine was ideal for the 2,000m<sup>2</sup> project as it was portable enough to move around with ease, and attended to the detailing of hard-to-reach surface areas.

All machines were fitted with a Diamatic vacuum to achieve a dustless operation, while bespoke dust extraction accessories were fitted to handheld grinders. AcryliCon MD Dean Ashmore confirmed recently that the products provided by Diamond Products were an essential part of the project. "Using Diamond Products tools, we were able to meet the needs of the customer specification, while maintaining the highest AcryliCon standards prescribed by AcryliCon International," he said.

## Complete solutions for all applications

Diamond Products director Brian Clark pointed out that the Diamatic range of machines are available in various sizes, ranging from a single head 220V electric system for small jobs, to a triple planetary head 380V systems for large projects. He said, "Diamatic grinders are designed for dependability and offer ease of use while providing efficient, cost-effective results with very little environmental impact."

The range of Diamatic products available through Diamond Products including floor preparation, grinding equipment and vacuum dust control systems were introduced to the local market in 2013. Since then, the sales of these products has shown strong growth.

Clark reveals that Diamond Products offers a complete solution for improving the aesthetics and functionality of concrete



The Diamatic 435 grinder

surfaces, from residential and architectural applications, to commercial and industrial sites. "Diamatic equipment supplied by Diamond Products is currently being used by several flooring contractors for the grinding and polishing of concrete floors in many different applications throughout Southern Africa," he remarked.

Ashmore adds that industrial floors are subjected to tough daily mechanical and chemical loads, and that floor protection should therefore be designed and warranted to withstand the same loads. He highlights that AcryliCon provides a wide range of high quality, durable, cleanable, rapid curing and VOC-free systems to meet client needs. These solutions and applications are supported with a warranty of up to 10 years.

"An integral part of our business success and growth is partnering with equipment service providers such as Diamond Products that understand our business and know that breakdowns onsite over nights and weekends are not a welcome event. If this does happen however, the owners and the operational staff are always willing to assist in any way possible," said Ashmore. ■



Diamond Products offers a complete solution for improving the aesthetics and functionality of concrete surfaces



Nicola Cristantielli  
with an Indeco HB 27  
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**The models in this photo are both 25 years old. But only one of them looks it.**

We trust our friend Nicola won't be offended, but our HB 27 doesn't really look its age, even after 25 years of hard work. It could be because when we design our products, we listen to what our users have been asking for. Or because we make them at our factory in Italy, with special materials manufactured exclusively under our patents. Or because we put all of our hearts into testing and after sales service. Perhaps it's because all Indeco products, old and new, are made for demolition and built to last.



Bauma Africa Johannesburg, 15-18 September 2015 - hall 6 stand H51



# Versatile tech for various applications

The specialised equipment for flooring projects, at the Concrete Surface Preparation Division of Lambson's Hire

Concrete surface preparation is applied to any new or existing concrete surface or structure. After undertaking thorough research into the needs of this sector and what Lambson's Hire now terms the ever-changing world of concrete, a Concrete Surface Preparation Division has been established. This is in line with the company's philosophy of offering the latest technology in order to best be able to meet its customers' needs.

Metal-bonded diamond media is used for grinding, ceramic or resin diamond media for polishing and polycrystalline diamond (PCD) tooling for aggressive grinding and coating removal. Lambson's Hire CEO Devin van Zyl explained, "Following an on-site assessment by our Concrete Surface Preparation team, we can easily advise a customer on the appropriate equipment and consumables for the given application."

## Improving productivity for improved profitability

The equipment range available from Lambson's Hire's Concrete Surface Preparation Division is aimed particularly at improving the productivity and cost effectiveness of Lambson's Hire's customers. An example of this would be the smaller 125mm handheld concrete grinder that can be used for concrete stairways. This offers a far more productive option when doing concrete preparation in multi-storey buildings.

The range from Lambson's Hire's Concrete Surface Preparation Division at present includes the Meteor 250 single disc electric



The Satellite floor grinding machine has a grinding width of 480mm

floor grinding machine, as well as the Satellite 480 triple disc planetary machine which is available in both electric and petrol options. The Meteor 250 weighs 65kg and has a grinding width of 250mm, while the larger Satellite 480 weighs 160kg and has a grinding width of 480mm.

These versatile machines allow for grinding, polishing, concrete removal, levelling, cleaning, glue removal and resurfacing functions. Easy to use and highly



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manoeuvrable, these machines are ideal for all concrete preparation tasks.

Van Zyl stressed that, in terms of meeting the requisite Occupational Health & Safety Advisory Services (OHSAS) requirements for South African building and construction sites, it is necessary for companies to also hire a dust collector. He said, "Not to be confused with commercial vacuum cleaners, these are purpose-built machines capable of catching and collecting even the finest of concrete dust."

The dust collectors available from Lambson's Hire were chosen for their performance as well as a special filter shaker feature which allows all dust to be removed from the filter itself after operation. Two dust collector options are available. A 25-litre unit weighing 31 kg, with a power output of 2.3kW/3.1HP and a 50mm outlet, and a larger 100-litre, 65kg dust collector with a power output of 3.5kW/4.6HP and an 80mm outlet.

"If used in the appropriate manner, dust collectors will allow our customers to meet the requisite on-site environmental regulations," van Zyl said. The dust collectors are supplemented by anti-static hosing to prevent shock.

Other stalwart products of Lambson's Hire's Concrete Surface Preparation Division include a three headed scabber that weighs 4.7kg, with a blow per minute rate of 2,800 and an 11-headed scabber, weighing 72kg capable of covering 30m<sup>2</sup>/h at a depth of 6mm, at a rate of 2,200 blows per minute. The smaller scabber requires an 18cfm air supply while the larger machine needs 60cfm.

#### Understanding equipment

In order to maximise the performance of this specialised equipment on hire, Lambson's Hire's Concrete Surface Preparation Division also offers customers assistance with on-site commissioning. "It entails much more than a simple understanding of the functioning of the equipment itself," van Zyl said.

Myriad complications can ensue if, for example, the incorrect tooling and consumables are used. Most of all, he warns that the inappropriate selection or use of concrete surface preparation



A specialised 60-litre dust collector, available from Lambson's Hire will ensure that companies comply with all environmental regulations

equipment can have a significant impact on a contractor's bottom line. If the required quality finishes are not being achieved and work has to be redone as a result, this will incur additional labour, hire and consumable costs.

"With the construction industry under pressure to perform and reduce operational costs, it is essential that contractors utilise fit-for-purpose equipment for specialised tasks such as concrete surface preparation. It is for this reason that we brought in the appropriate equipment for our Concrete Surface Preparation division at a significant investment to meet this need," van Zyl said.

Lambson's Hire's team regularly visits international exhibitions to stay abreast of the latest trends and developments.

"We have access to our equipment principles overseas in terms of technical input whenever necessary, while our team undergoes regular training," van Zyl noted.

In addition to Lambson's Hire's Concrete Surface Preparation range consisting of quality equipment with a strong international reference base, it is equally important that such equipment is suited to the harsh working conditions found in Africa.

"Lambson's Hire will continue to make the latest and best quality products for these applications available to its customers as it strives to remain ahead of the technology development curve," van Zyl affirmed. "Lambson's Hire has always been at the forefront of progress, and that is our ongoing strategy. It is our philosophy to offer only superior quality equipment capable of achieving the best results for hire. Our direction for the future is to be persistently diverse in our thinking and to continue to create speciality divisions such as our Concrete Surface Preparation and Compact Plant divisions. This will allow us to acquire the latest expertise in these specific fields to pass on to our customers, as well as increase our own service levels and value proposition. Our ultimate aim is to drive down our customers' costs and boost their bottom line." ■

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# Managing temporary structures today

Modern requirements for utilising formwork, and how different materials compare for use

An ancillary construction, formwork is used as the base mould a structure, into which fresh concrete is placed before hardening. Building formwork takes time and accounts typically for between a fifth and a quarter of the cost of a structure or even more. There are two types of forms; panel and stationary. Both types of formwork are temporary. However, once removed, is a process known as stripping, panel forms are reusable. Stationary forms are non-usable.

Most forms are made of timber. Timber formwork is prone to warping, swelling and shrinking. However, the application of water to the surface of the wood can mitigate such issues.

As noted by Gopal Mishra, civil engineer at L&T ECC and author of The Constructor weblog, good formwork should meet several requirements. It should be strong enough to withstand all types of dead and live loads. It should be rigidly constructed and efficiently propped and braced both horizontally and vertically, in order to retain its shape. The joints in the formwork should be tight against leakage of cement grout. Construction of formwork should permit removal of various parts in desired sequences without damage to the concrete. The material of the formwork should be cheap, easily available and should be suitable for reuse. The formwork should be set accurately to the desired line and levels should have plane surface. It should be as light as possible. The material of the formwork should not warp or get distorted when exposed to the elements. And it should rest on a firm base.

## Cost-effective work with forms

As Mr Mishra observes, it is possible to keep the cost of formwork to a minimum, by adhering to five best practices. The plan of the building should imply a minimum number of variations in the size of rooms, floor area, and so on, in order to permit repeated reuse of the formwork. The design should be enable use of

slender sections. There should be minimum sawing and cutting of wooden pieces, and these should be made to enable reuse. The quantity of surface finish depends on the quality of the formwork.

Although formwork can be made of timber or plywood, it can also consist of steel, precast concrete or fibre glass, and combinations of materials may be used. Steel forms are used typically where large numbers of re-use of the same forms are necessary. For smaller projects, timber formwork is ideal. Fibre glass forms, made of pre-cast concrete and aluminium, are used to create buildings with slabs or where construction involves curved surfaces.

## Types of forms

When timber is used as form, it should be well-seasoned, light, compatible with use of nails, free from loose knots - and, when timber is used for shuttering for exposed concrete work, it should have smooth and even surfaces coming in contact with concrete. Typically, members used as sheeting for slabs, beams, column sides and beam bottoms are 25mm to 40mm thick. Timber for joints and ledges range from 50x70mm to 50x150mm. Posts are, ordinarily, between 75x100mm and 100x100mm.

Plywood forms consists of resin-bonded plywood sheets, which are attached to timber frames to make up panels of required sizes. The cost of plywood formwork compares favourably with that of timber shuttering, and it may even be cheaper in certain cases. With plywood, it is possible to have a smooth finish with less formal surface finishing involved. It is possible, also, to use large size panels to enable saving on the labour costs incurred in fixing and dismantling.

It is possible to reuse plywood more than timber shuttering, too.

Steel formwork consists of panels manufactured from thin steel plates stiffened along the edges by small steel angles, which can be held together by clamps or bolts and

nuts. The panels can be made in large numbers and in any desired modular shape or size. In the main, steel forms are used for large projects or in where a large number of reuses of the shuttering is possible. They are ideally suited to circular or curved structures.

Steel forms are stronger and more durable than timber, and more reuses are possible. They can be installed and dismantled with greater ease and speed than timber, too. Exposed concrete surfaces created by using steel forms need no additional treatment. Moreover, steel formwork does not absorb moisture from concrete, and does not shrink or warp. ■

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# Kansanshi's new housing complex

Kipemba Suburb Project represents real progress in accommodation and associated infrastructure for workers and their families in Zambia

**F**irst Quantum Minerals (FQM) subsidiary Kansanshi Mining Plc (KMP) has committed to plans to develop a 1,000 hectare piece of land into a satellite suburb called Kipemba Suburb Project in Kipemba area of Chief Mumenya's chiefdom, about 12km west of Solwezi's central business district in north-western Zambia.

## Agency assessments for accommodation

According to the environmental impact assessment (EIA) report for the proposed development submitted to the Zambia Environmental Management Agency (ZEMA), the Kipemba Suburb complex will have the capacity to accommodate up to 8,200 residential units of mixed density and types, mainly free-standing medium-cost units to house KMP employees. Other facilities will include clinics, primary and secondary schools, a university; public parks, recreational facilities, industrial and commercial area.

Provisions have been made for a central business with shops/market place, library, cultural and community facilities, a post office and a police post. The estimated cost of the project is at least \$350 million.

"The proposed project activities include the following major works: construction of site offices and builder's supply facilities, removal of vegetation, stripping of topsoil and earth works, water abstraction, materials mobilisation, road and drainage construction, construction and laying of water and sewer mains, sub-structural works, super-structural works, landscaping, maintenance works and waste management," the report reads in part.

Residential facilities will take up about 173 hectares; 2798 high density houses; 438 medium density houses, 1 802 low density houses, 1 200 town houses and 2 000 apartments

In a related development, another FQM subsidiary, Kalumbila Minerals Limited (KML) plans to construct an airport in North-

Western Province at a cost of over \$2 million.

## Moving in

The main objective of the proposed airport is to facilitate the movement of people and goods for the development of the Trident project in the provincial capital, Solwezi, according to an environmental impact assessment (EIA) report by KML submitted to the Zambia Environmental Management Agency (ZEMA).

Currently, KML is engaged in the development of potentially three new copper mines which are collectively known as the Trident project. The project implementation is expected to start upon ZEMA approval. About 40 people are expected to be employed during the construction of the airport, which will last about 18 months.

"In order to improve regional and international connectivity with the Trident project, KML have proposed to construct an airport and associated infrastructure capable of handling larger passenger numbers as well as larger cargo aircraft," the EIA says.

The total estimated cost for the proposed Kalumbila town airport project is US\$2,067,676. The project development of the airport will evolve the preparation, construction and operation phases. Under the preparation phase, the project will include site selection and clearing, and subsequent airport development. The project will entail the construction of a 2,700-metre long and 42-metre wide airport. Additionally, the project will involve the construction of a fuel storage area, parking, terminal building and a control tower.

The project will be designed and constructed by KML, but is likely to be transferred to and operated by a third party during the operation phase.

"To maintain maximum safety at the airport, it will be necessary to carry out clearing activities around the airport, especially during the rainy season. This will

aid visibility and prevent wildlife encroachment," the report adds.

The project is also expected to have positive and negative impacts on the environment and the economy of Zambia. It is envisaged that the project will have positive impacts on the local, regional and national level, resulting in improved regional transport, tourism and economy of the project area.

Negatively, the project is expected to cause air pollution, land degradation and ecological disturbances. ■

*Nawa Mutumweno*

## The equity in ESG

Environmental, social and governance (ESG) awareness and integrated reporting have become crucial in the 21st century, and private equity investors are taking this into account and helping to drive best practice, attendees heard at the recent launch of the first Southern African Venture Capital and Private Equity Association (SAVCA) Case Study Compendium, a collection of 16 studies showcasing how private equity investment is resulting in more sustainable business practices and positive community outcomes.

Christopher Clarke, partner at Inspired Evolution, highlighted his fund's investment in Red Cap, which is developing a portfolio of wind energy projects across Southern Africa, as an example of one challenge surfacing in the private equity arena: how to create realistic expectations in communities where projects such as these are developed. Mike Goldblatt, investment lead at Metier, added that, in long-term projects such as renewable energy and affordable housing development, transparency is important from the outset to manage expectations.

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# Stable designs open doors to safety

How Apex SR 9000 insulated impact traffic doors provide unhindered and efficient flowthrough

**B**ottlenecks often occur when the volume of pedestrian, cart and man-ridden traffic inside facilities increases. Ensuring that traffic is allowed to pass through openings in an unhindered manner will result in decreased frustration and increased productivity.

## Functional and robust

By eliminating the stop, open, move through and manual actions that traditional single, one-way swing doors require, will provide the desired results. The Apex SR 9000 insulated impact traffic door combines functionality with longevity, opening with a simple hand push or on impact from a cart or man-ridden vehicle such as a forklift truck. The door then automatically closes after traffic has passed through.

In spite of its lightweight construction, the Apex SR 9000 door is engineered and manufactured to be robust. Adding to its durability and low maintenance requirements,

the perimeter edges on the door panels are bull nosed with a minimum radius of 8mm, which prevents excessive wear on the edges. High bumpers are also fitted to the door panel to further absorb impact from man-ridden vehicles and carts, as well as reduce stress on hardware and mount assemblies.

The patented 'honeycomb' framework and flexible urethane foam insulation give the door optimum stability and superior soundproofing qualities. This characteristic makes the Apex SR 9000 the perfect choice for use in noise-sensitive areas such as hospitals, hotels, conference centres and restaurants. In addition, the 3mm ABS skin retains its physical properties down to temperatures of minus 40°C, making it ideal for walk-in cold rooms. The low maintenance skin is impervious to moisture, acids, petroleum products, animal fats, rodent, insects and salt solutions and is easily and quickly cleaned for rapid turnaround time.

## Technical support for traffic

High volumes of traffic present potentially high possibilities of accidents occurring. This is mitigated by the inclusion of standard vision panels in the Apex SR 9000 doors.

Constructed from 3mm clear polycarbonate sheeting, these panels are available in a number of custom sizes and are scratch-resistance and UBC compatible.

Determination of the optimum mounting position of the windows allows for enhanced visibility, in accordance with safe operational requirements. For refrigerated areas, double panel vision panels can be installed.

"As with all applications, it is important to ascertain the optimum design elements for each customer's specific needs. Our extended team of agents throughout South Africa are available to offer technical and installation support that ensures longevity combined with productivity within any workplace environment," said Apex Strip Curtains & Doors managing director Wim Dessing. ■



The Apex SR 9000 insulated impact traffic door combines functionality with longevity



The Apex SR 9000 the perfect choice for use in noise-sensitive areas such as hospitals, hotels, conference centres and restaurants

# Century City structures



A general site view of the contract at Urban Square, Century City



A view of the Bridge Park construction

The extensive experience garnered by Murray & Roberts Western Cape in South Africa's construction industry has seen it secure many high-profile projects. The company has the necessary skills and resources to build both new structures and refurbish old buildings. This flexibility has resulted in a steady order book from major clients, a significant achievement in the current economic environment.

Examples of the company's diverse projects include the flagship Century City mixed-use development, the refurbishment of the existing tower blocks at Merriman Square, the new Melomed Hospital in Tokai and the new eTV headquarters building in the heart of Cape Town. "Such a range of projects demonstrates that Murray & Roberts Western

Cape is sufficiently flexible in its implementation strategy. This is a critical differentiator for us in these tough times. The construction industry has had to adapt its service offering as a result, and we are at the vanguard of being more responsive and innovative," Dave Heron, the company's managing director, said.

At Century City, Murray & Roberts Western Cape is running three distinct projects, namely Urban Square, Grosvenor Square and Bridge Park for one of its main clients the Rabie Property Group. "We secured the Bridge Park contract on competitive tender. Our success on that project in terms of delivery and quality placed us in an excellent position to carry on at Urban Square," Heron said. ■

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# Project management on the road

How multiple challenges were addressed in order to complete the Ballito Interchange upgrade



The newly-completed improvements to the Ballito Interchange, looking eastwards to Ballito

A successful project to upgrade the Ballito Interchange in Durban, KwaZulu-Natal involved extensive input from SMEC South Africa right from the design stage to overseeing the actual construction. Additional challenges included accommodating existing traffic and even pedestrian use.

The South African National Roads Agency SOC Limited (SANRAL) initiated the project originally to improve the capacity of the Ballito Interchange, which became highly congested at peak times. The initial plan was to add a single loop ramp to accommodate east-to-north turning movement.

However, a detailed traffic study carried out by SMEC South Africa indicated that this solution would at best be a stopgap measure. In addition, construction of a new loop ramp would necessitate lengthening the existing bridge, an undertaking that

would make it extremely difficult to accommodate existing traffic.

“Taking future growth into account, we also found that a single loop ramp would not suffice. There were other capacity considerations in keeping the traffic flowing,” reported Dawie Erasmus, SMEC South Africa functional head for roads and highways. “That led us to consider the possibility of a new bridge that could accommodate double loop ramps underneath it, as well as the additional lanes on the cross road on top. This could be constructed with the traffic utilising the existing bridge.”

Certain deficiencies in the existing bridge deck were also identified. These supported the building of a new bridge.

#### Requirements and results on the road

Such detailed analysis of the existing infrastructure, in tandem with the client’s

specific requirements, resulted in SMEC South Africa coming up with the most practical and cost-effective solution possible.

“We proposed building a partial clover leaf interchange with two loop ramps, but shifted slightly south so that these loops could be fitted in,” Erasmus observed. This was necessitated by the fact that quite severe land topography constraints and development in the eastern quadrant limited what could be done.

SMEC South Africa then embarked on extensive opinion discussions with the client, with the end result being almost a total redesign and rebuild of the Ballito Interchange. The construction phase of the project lasted 18 months, with Stefanutti & Stocks Civils KZN appointed as the main contractor.

“We were not only responsible for the design, but also monitored the construction



SMEC conducted detailed analysis of the existing infrastructure, to meet client requirements

period," Erasmus said. SMEC South Africa had a Resident Engineer and an Assistant Resident Engineer on-site, in addition to a contracts manager overseeing the project.

A pavement specification was used that could accommodate traffic during construction. The asphalt base course was applied in sections depending on traffic accommodation requirements. Therefore the final asphalt wearing course was only applied once the base course was completed on the entire interchange.

"This was done so we could switch traffic during the various construction stages and have temporary line markings on the asphalt base, which would later be overlaid with the final asphalt wearing course," Erasmus explained.

#### A complex project

There were a number of traffic accommodation phases during the construction period. The old bridge was kept open until nearly the end of the project, when the new structure was ready to take traffic. At this point the old bridge was demolished.

The foundations for the new bridge involved a detailed geotechnical investigation as the typical Berea sand type formations in the area are not ideal for bridge founding. The harder rock was more than 25m deep. Spread footings were still opted for, but at a founding level of about 5m below ground level, with pre-treated foundation platforms to limit the settlement of the bridge piers.

Erasmus points to all these different elements adding to the overall complexity of

the project. "In addition to all the components of a typical road project, we also had to contend with quite intricate structures and geotechnical investigations. The road design and asphalt technology we applied was the latest available," Erasmus said.

Retaining walls were necessary due to the fact that where two road elements were immediately adjacent to each other, they were nevertheless separated by quite a high level difference. This called for retainment between the upper and lower levels using a contiguously piled type retaining wall. Upon completion, these were clad with precast concrete to enhance the aesthetic appearance.

A unique feature of the project was that it had to accommodate pedestrian movement. "That was an important safety consideration during the design phase," Erasmus remarked.

Safe pedestrian drop-off zones were provided for on the N2, with pedestrian walkways behind protected barriers where these were adjacent to the roadway itself.

Traffic signals were also provided at the two ramp terminals to create safe opportunities for pedestrians to cross over. In order to increase visibility and safety at night, SMEC South Africa was also asked to provide street-lighting for the project.

"We also had to look at some changes to the onramp configuration on the N2, which in this section consisted of a concrete pavement. We had to ensure that the new concrete pavement was an exact match with the existing one," Erasmus stressed. The project has been completed successfully, with SANRAL reportedly very happy with the end result. ■



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# Stable, capable, comfortable, and safe

The new generation of Bobcat's 1-2 tonne compact excavators offer unique features for optimal performance



Bobcat's new E17 compact excavator offers new levels of performance

Bobcat's new E17, E19 and E20 compact excavators - the next generation of 1-2 tonne excavator models from the company - offer new levels of high performance and an unmatched combination of class-leading breakout forces, working range, smoothness of workgroup functions, hydraulic output and fast cycle times, centred around a roomy and comfortable operator environment, durability and excellent service access.

The new models are towable on trailers for up to 2,000kg, with transportability further enhanced by new tie-down points. An expandable undercarriage, automatic slew brake and advanced diagnostics and instrumentation are just some of the many standard features included on all three excavators.

#### Optimum operator comfort and safety

Like all Bobcat compact equipment, the new

excavators are built around the operator, providing optimal ergonomics for operators of all sizes. The new cab design on the excavators features large windows and narrow pillars to maximise all-around visibility. As a result, the cabs on the E17 to E20 provide an uncompromised operator environment which, together with the excellent visibility, provides the best possible operator comfort and safety.

The new E20 2 tonne model is a Zero Housing Swing (ZHS) excavator, which means that despite featuring a full-sized cab, it still enhances Zero Tail Swing (ZTS) functionality by further protecting the front upper structure corners turning within the swing circle. The ZHS configuration in the E20 excavator therefore provides 320° of free rotation when working close to structures, without sacrificing on operator comfort or performance. Access to the operator's seat in the E17, E19 and E20 is simple thanks to the

large door opening and the fact that the control console rises completely out of the way when the operator is taking their seat. There is ample space for the feet with a flat floor for easy cleaning with floor panels that can be easily removed for service purposes, ergonomic pedals and easy access to all controls, storage box and cup holders. In addition, when not in use, the foot pedals can be folded back to further increase room for the operator's feet.

The superior comfort offered by all three models allows operators to work for hours at a time. Overall, the compact size and superior stability of the new E17, E19 and E20 excavators make these machines ideal for the most heavy duty applications in confined areas.

#### Unique-in-class features

Premium features contributing to first-class comfort and safety include an optional,



► unique-in-class joystick control of boom swing and auxiliary hydraulics with three selectable auxiliary modes for more precision and more leg room; optional auto shift drive motors and seat options for optimal operator preference.

The excavators have a new control panel that ensures all parameters can be checked quickly and easily in a single viewing, including standard readouts such as the fuel gauge and RPM meter but also auto engine shut-down; auto glow plugs countdown; auto cab lights switch-off and audible alarm (in case of malfunction).

Other features include an easy-to-operate gas spring-assisted light and rigid frame front window, keyless ignition for optimal safety, a battery kill switch for storage and to prevent theft and an automatic slew brake for safe parking and transportation.

The unique hydraulic systems on the new E17, E19 and E20 models make the best possible use of the engine power on the excavators. Fast cycle times, combined with smooth control of the class-leading breakout forces provide maximum productivity. Boom and arm cylinder cushioning, another unique feature in this class of excavator also increases overall smoothness.

With enhanced stability and lifting capacity, combined with best-in-class proportional auxiliary flow, the new E17, E19 and E20 models offer the highest versatility in operating a wide range of attachments. Stability is essential for making maximum use of the digging forces and lifting capacities. Optimum stability is achieved by fully expanding the retractable undercarriage and using the optional long dozer blade. In addition, though it is a true ZHS machine, the stability of the E20 model is comparable to that of best-in-class conventional machines on the market.

The superior dumping height makes loading trucks an easy task, while the reach at ground level greatly reduces the need to reposition the machines when digging. Picking up and placing heavy items are simple processes with all three models. In addition, these machines now come with an optional certified 'object handling device', which consists of boom load holding valve, arm load holding valve, hooking device and overload warning device.

#### Expandable undercarriage

When fully retracted, the undercarriage allows the excavator to go through narrow spaces;

and, when fully expanded, it provides optimum stability for the excavator, especially when working over the side. Expansion and retraction are simple and easy via a switch on the control panel. In addition, to help dustpanning on the front, the long dozer blade (optional for all three models) significantly enhances stability at the front of the excavator, allowing the operator to make full use of the breakout forces that the machines can deliver.

The use of highly durable materials ensures that the Bobcat E17, E19 and E20 models offer hard-wearing and robust performance. All components and design features are tested under extreme conditions and the heavy steel gauge tailgate ensures extra durability and peace of mind while working.

The tailgate and side cover can be quickly opened to provide immediate access to conveniently located components such as easily cleaned side-by-side coolers and other daily maintenance and service points, reducing downtime to a minimum. Maintenance and service work is further simplified by the diagnostics on the new excavators, including the error codes displayed on the control panel and service tool connection. ■

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# Model machines for profit potential

C series articulated trucks help save money with improved cycle times, fuel efficiency, automated systems and ease of operation

The new Cat 735C, 740C EJ, and 745C articulated trucks build on the proven performance, reliability and durability of their B Series predecessors with significant new features. These include new transmissions with expanded electronic control, automatic traction control, automatic retarder control, hill assist and waiting brake systems, and an optional payload weighing system - all aimed at delivering lower costs per ton by reducing cycle times, saving fuel, and easing the operator's work load.

Rated payload capacities for the new models are 36, 42, and 45.2 tons (32.7, 38, and 41 mt), respectively, with all models replacing their B Series predecessors. The new 745C's 1.7-ton (1.5 mt) capacity increase (compared with the 740B's capacity) combines with its faster cycle times for significant production gains.

The new 740C EJ ejector model, which combines the 745C's tractor with a horizontal-discharge body, provides added versatility and safety in certain operations. The 740C EJ can unload material to uniform depths while travelling at speed, potentially reducing the need for on-site spreading equipment, and can discharge the load with added stability in soft underfoot conditions, on side slopes and grades, and in environments where overhead obstructions are present.

## New power-train efficiency

The 735C's Cat C15 ACERT engine is rated at 452 horsepower (337 kW) and the C18 ACERT engine in the 740C EJ and 745C is rated at 511 horsepower (381 kW). The new Cat CX38 High Density Power Shift transmission used in the C Series trucks has nine forward speeds, two reverse speeds, and a number of electronic features that enhance overall performance and productivity:

- Electronic Clutch Pressure Control, for example, modulates transmission-clutch engagement for smooth shifting and extended component life, and the



The 735C from Caterpillar

Advanced Productivity Electronic Control Strategy feature is aimed at optimizing gear selection in all operating situations for efficient performance and fuel economy.

- Shift Torque Management, combined with the improved Shift Control Logic feature, maintains consistent torque flow through the transmission during gear-range changes, provides automatic shift selection tailored to machine operation, and automatically downshifts for acceleration. Part Throttle Shifting allows shifting at lower engine speeds, resulting in improved fuel efficiency, quieter operation, and easier low-speed manoeuvring.

With permanent six-wheel drive, encounter changing terrain and underfoot conditions, the Automatic Traction Control feature adjusts the level of engagement for the clutch locks in the inter-axle differential and in the three axle differentials. The system makes these adjustments while the machine is moving and does not require operator intervention. The system maintains optimum traction for steady production, relieves the operator of manually engaging the system, saves fuel by proportionally applying the locks based on operating conditions, and does not hinder tight-manoeuve steering.

Retarding control for the C Series models can now be set to fully automatic, in addition to manual control. In automatic mode, the

machine manages retarding through a combination of engine brake, gear selection, and service-brake application without operator intervention. The automatic system is available for both forward and reverse operations, and the manual system provides two levels of engagement for more experienced operators.

Other features that contribute to the overall efficiency and ease of operation include the Hill Assist system, which facilitates stopping and starting on grades, and the Waiting Brake system, which temporarily applies the service brakes during pauses in the work cycle, whether waiting at the loading or dumping site or delays from site congestion.

## Cat Connect technologies

Cat Connect PAYLOAD technologies for the 735C, 740C EJ, and 745C help customers optimize operations and improve overall jobsite efficiency. With Cat Production Measurement as an option, operators can measure and deliver accurate payloads with confidence to boost productivity, lower costs and prevent the potential for overload damage. When used with Cat Connect LINK technologies, PAYLOAD data can be accessed through the online VisionLink user interface. With accurate, reliable, performance and productivity data, customers can make timely, fact-based decisions about their fleet and effectively manage their jobsites. ■

# Equipment to expand a building business

The 'smart' turnkey solutions provided by SPH Kundalila for construction and mining operators in South Africa

SPH Kundalila's approach to supplying 'smart' turnkey solutions for its customers in the aggregate and mining industries has stood the company in good stead to become involved in some of the largest projects underway in South Africa's Western Cape region, from mining and aggregate operations to solar-energy farms.

Acquired by the Raubex Group in 2007, SPH Kundalila has provided comprehensive materials-handling solutions for the mining and construction industry since 1969. In addition, it has developed significant expertise in related engineering aspects such as site rehabilitation, road building and infrastructure development.

This has boosted the company's reputation as being a total solutions provider, with a growing reference base in the Cape region in particular. "We have a major footprint in the Western Cape, while the Northern Cape is becoming an important focus for us in terms of our future growth and expansion," said Johan Le Roux, SPH Kundalila business development manager.

The Northern Cape is a regional focus for major mining and infrastructure projects.

### From a maiden project to material operations

At present, SPH Kundalila is carrying out work at the Port of Saldanha. This was the company's maiden contract - and the source of its name, which translates as Saldanha Plant Hire (SPH). It also operates a dolomite quarry at Mooresburg and an aggregate quarry at Aggeneys. "Our strong presence in such strategic locations places us in a unique position to be able to offer a complete service for our customers," Le Roux said.



The material from the Aggeneys operation comprises concrete stone mainly for infrastructure development, while the Mooresburg operation produces material specifically for Saldanha Steel's furnace operations. In addition, Mooresburg produces agricultural lime for use in the farming industry, which is stockpiled and sold to farmers during the peak planting season at the beginning of the year. This single-source lime material is of a particularly fine quality compared to competitor products, which are traditionally blended with additional materials.

"Anticipating customers' future needs is one of our differentiators and with the mining industry being under pressure, we need to remain flexible and responsive and ensure that we offer customer optimum performance at all our contracts. We have a well maintained fleet of equipment which ensure reliable operation at all times," Le Roux remarked. SPH Kundalila boasts a major fleet of 350 pieces of equipment, including the largest number of Caterpillar 950 loaders in the Southern Hemisphere. "We have a strong replacement policy which ensures our fleet remains up to date and incorporates the latest technology. It is critical that our equipment operates at optimal efficiency at all times, which increases the productivity of our operations and reduces running and maintenance costs," Le Roux said. ■

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# Commercial values in coloured gemstones

Industrial extraction of diamonds, gold, emeralds and rubies is gaining strength, with Zambian miners leading by quantity and revenues

The coloured gem market is booming. The world market for rough stones has grown at a rate of approximately 18 per cent over the last five years. Its worth in terms of global imports comes to around US\$3.3bn. Moreover until the 1940s, coloured gemstones represented practically half of the fine jewellery market, indicating its massive potential. Africa remains one of the major regions for coloured gem mining, and interest in its activities in this area is inevitably on the rise.

On one level, the coloured gemstone mining industry in Africa is a tale of unfulfilled potential. Zambia's emerald industry is a classic case in point. Zambia is the biggest emerald producer in Africa and the third major source of emeralds in the world after Colombia and Brazil. Zambia produces one fifth of the world's emeralds, which comes to a value of around US\$200mn each year.

## Plans for superior production

The Zambian government has been criticised for not investing enough in small scale emerald mining operations in order to bring their production levels up. Although the European Union recently offered 30mn euros worth of financing to small scale emerald producers in the country, a lot of local mining operations were unable to profit from the offer because the financing came with conditions that were too difficult for many to meet.

Zambia's government did recently announce plans to introduce a grant worth 50mn kwacha (US\$10mn) to help small scale miners to boost their production. However, the government's recent move to raise royalties from open-pit mines also has implications for big players in the country's emerald sector. It may spur on Gemfields to speed up the development of its underground mining operations at its operation in Zambia. This is because royalties for underground mines are significantly less now. On January 1 the royalty tax regime in Zambia was altered. Mining royalties for

open-pit copper mines were raised from six per cent to 20 per cent. For underground mines, royalties were only slightly increased, from six per cent to eight per cent.

"It does give a financial incentive to accelerate underground development," Bloomberg quoted the company's director, Sean Gilbertson, as saying in an interview in November.

Nonetheless, it seems that Gemfields still has some way to go before it is able to shift its operations significantly toward underground mining. The company's Kagem operation is, for the large part, based on open pit mining. The firm is only in the trial phase with its underground mining activities, although they have been ongoing for a few years now.

Luckily, however, it does not seem that the change in the tax regime is going to compromise the operations of Gemfields in the dramatic way that it is in the copper mining sector. Barrick Gold has been in the headlines since it announced plans to lay off thousands of workers at its Zambian copper mine as a direct result of the tripling of royalties for open pit mines. In contrast, Gemfields has stated that it does not anticipate the changes to have a significant impact on the company, at least in terms of its fiscal payments.

## Exciting enterprises

Challenges in Zambia are not the only side to this story, however. There are some extremely exciting developments happening in the coloured gemstones sector, which hints that the industry might be at a key transitional moment in its history. The African ruby industry has, in particular, enjoyed some very positive headlines recently. In December, Gemfields attracted wide scale attention when it made one of the biggest single ruby discoveries for years in Mozambique. The stone weighed in at 40.23 carats, and was discovered at the company's Montepuez deposit, which is a 340 square kilometre

operation situated in Mozambique. The discovery has only reinforced Montepuez' status as one of the most if not the most important ruby mining area in the world.

It is partly due to this weighty discovery that Gemfields enjoyed a record breaking auction session in Singapore in December, managing to generate US\$43.3mn from African ruby sales. This represented a big step up from its previous auction in June, which raked in US\$33.5mn. These two results combined indicate that the company has accumulated US\$76.8mn from rubies it has discovered in Montepuez.

The company attracted US\$689/ct for the 62,936ct sold, which amounted to 74 per cent of the 85,491ct up for grabs. Average sales value for the June auction was US\$18.43/ct, in contrast.

This contrasts sharply with the average sales value at the June auction of US\$18.43/ct.

In total, fifty companies participated in the bidding for Gemfields' December auction. Bidders included companies from the UK, USA, Germany, Chinese, India, Japan and Israel.

"Indeed, Gemfields certainly did achieve record sales at its recent auction of high quality rough ruby extracted from the Montepuez ruby deposit in Mozambique, a fact which further highlights the considerable and sustained increase in demand for premium-quality, responsibly-sourced coloured gemstones globally, that we have experienced for some time now and across all markets," said Ian Harebottle, CEO of Gemfields.

"Gemfields also secured the successful sale of an exceptional 40.23 carat rough 'Rhino Ruby' at the auction, with the price remaining undisclosed given the principles on which Gemfields' auctions are conducted. So, in short, the auction was a success, but the level of increased consumer demand for coloured gemstones and the incredible beauty and quality of the rubies we are currently mining in Mozambique meant that we were more or

less anticipating these results, even though the final outcome was even a little better than anticipated," said Harebottle.

Gemfields has plans to organise further auctions in early 2015.

"While the exact dates are yet to be fully confirmed, we are planning to auction the lower qualities of material for both emeralds and rubies at some point during the first quarter of 2015," said Harebottle.

"Given the more commercial nature of these goods, [as opposed to the higher qualities of material that were sold in either of our last emerald and ruby auctions], the volumes placed on offer will be considerably higher, while the overall revenues achieved are likely to be lower

"This is not to say that any single auction is more important than the other. While the higher quality auctions are centered around the rarer and thus higher priced gems, the lower quality auctions deliver most of the more commercial and high-street gems, with each of these playing very important roles in the continued growth of this sector."

#### New movement across mining territories

The company also intends to expand its mining operations in Mozambique further. "In anticipation of future global demand for Mozambican rubies, Gemfields has recently acquired controlling interests in two additional ruby deposits in the Montepuez district of the Cabo Delgado province in Mozambique and is developing plans to significantly increase the scale of operations on its existing mining license, with a commensurate increase in production output," said Harebottle.

Gemfields has started a fourth high wall pushback at the Kagem emerald mine in Zambia too, with the aim of expanding the size of the pit and open up new areas of ore. It is hoped that the outcome will be four years of open pit ore production. The company is also involved in considerable exploration work across the Kagem area.

"While it is still early days, we do believe that these efforts, coupled with some other projects that are also ongoing, should support a continued increase in overall production volumes over the next few years," said Harebottle.

The company's CEO also hints that Gemfields could well move into new mining territories in Africa in the future. "The company is constantly considering new opportunities to expand its portfolio of coloured gemstones and is actively researching the market looking for high quality and commercially viable deposits within the mineral-rich continent of Africa and across the world," Harebottle said.

The impressive performance on Gemfields on the ruby front has prompted discussion from analysts about whether Gemfields can help pullup Africa's coloured gems industry to narrow the gap between it and the far more developed diamond sector in Africa. Some think that this should be possible. After all, until the 1940s, diamond and coloured gemstone sales were reasonably similar. However, a shift soon started to take place as diamond supplies remained consistent whereas coloured gemstone supplies became increasingly erratic. Whereas the diamond industry in Africa has burgeoned over the decades, the coloured gemstone sector has been on the backfoot ever since.

"For centuries, coloured gemstones have been listed treasured possessions [long before diamonds] and have played a significant role in personal value creation and notable family heirloom collections," said Harbottle.

"Coloured gemstones competed with diamonds and all other luxury goods right up until the mid-1940s, in a time when luxury was primarily determined by rarity, quality and beauty. However they began to lose ground over time as marketing began to play an ever increasingly important role - an aspect which De Beers managed very well." ■

*Sherelle Jacobs*

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# Engineered for increased throughput

System design and development to optimise bulk materials handling in the diamond sector

Numerous successful installations of Weba Chute Systems in the diamond-mining industry have proved that the correct application of the company's scientific approach to the dynamics of bulk materials handling can completely eliminate the problems associated with conventional transfer chutes, resulting in significant cost savings in the diamond-mining industry, according to founder Werner Baller. The Weba Chute System is based on the lined 'super tube' or cascade system that results from those occasions when material runs on material.

## Innovating systems

Apart from being specified for long-term refurbishment contracts at some major diamond mines, Weba Chute Systems has also introduced specific innovations for the diamond-mining industry. These include a slurry screen splitter distributor system that allows for a nominal belt capacity of 600 tph, with a water and effluent addition of 1,080m<sup>3</sup>/h at a particular diamond mine.

"This was a very interesting application whereby the scrubbing process takes place within the actual chute itself, which was designed in such a manner that it caused a change in direction, resulting in turbulence and therefore a scrubbing action within the material being transferred," Baller explained. In order to facilitate the scrubbing process, water is introduced at strategic points inside the chute.

Bulk materials handling poses a significant challenge in the diamond-mining industry, where conveyor systems have to deal with



There are 400 Weba Chute Systems in operation in the diamond-mining industry in Botswana

belt speeds from 2.5m/second to 5m/second. Baller noted that Weba Chute Systems has accumulated significant intellectual capital about "the perfect transfer point", which includes conveyor to conveyor, conveyor to stockpile and conveyor to screen applications.

Weba Chute Systems has pioneered the development of transfer-point technology in the mining industry, with more than 4,000 of its systems installed globally to date. Baller said, "The Weba Chute System is applicable to any situation where bulk materials handling is required, from cement to the mining of all commodities and minerals, including diamonds."

## Holistic handling

Diamond-mining companies tend to focus on the infrastructure related to their kimberlite pipe mining operations, often at the expense of their bulk materials handling systems – and, in particular, transfer points. If designed and engineered properly, taking into account the overall system, transfer points can play a vital role in increased throughput and productivity.

"We consider a holistic design that does not only focus on the entry and exit points, but which also incorporates the control of the flow, volume and velocity of the material being transferred at all times," Baller said. By custom designing each transfer point, individual Weba Chute Systems can be configured to control the direction, flow and velocity of the calculated volume and type of material processed in a particular application. The end result is a transfer point that substantially reduces maintenance expenditure in the diamond-mining industry." ■



The Weba Chute Systems is suited for any bulk materials handling application

# Pumping relief for ponds and reservoirs

Integrated Pump Rental has proactively addressed the need for easier removal of silt and built-up sediments from process water ponds, return water ponds and other water storage areas. The introduction of the SlurrySucker Dredge Units into the company's short- and long-term hire fleet will assist mines in on-going maintenance.

"Severely silted up ponds and reservoirs can impact on the water storage capabilities of a mine or plant, negatively affecting downstream processes. Designed and engineered locally by Integrated Pump Rental, the SlurrySucker Dredge Unit is capable of extracting high tonnages due to the design and engineering of the dredge head," says Lee Vine, general manager at Integrated Pump Rental. This innovative dredge unit is suitable for



The SlurrySucker Dredge Unit is capable of extracting high tonnages due to the design and engineering of the dredge head

dredging and cleaning water capture areas where silt or slimes is an issue or where water retention and water holding capacity is being threatened. With this dredge unit regular cleaning of process water ponds, return water dams or other water storage areas is made simpler and faster.

## Dynamic development of design

During the developmental stages, Integrated Pump Technology made use of computational fluid dynamics (CFD) to optimise and validate the design. This provides customers with the assurance that the performance of the SlurrySucker and its engineering integrity are maximised.

Vine points out that two standard units are available. The smaller or SlurrySucker Mini is capable of extracting 120m<sup>3</sup> per hour of slurry/water mixture, equating to 30 to 40 dry tons per hour. Double this extraction volume can be achieved with the SlurrySucker Maxi, which will remove between 70 to 80 dry tons per hour. The SlurrySucker Mini has a 100 mm discharge and the SlurrySucker Maxi has a 150mm discharge. ■

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# Power

## Interchangeable battery technology by Bosch

Operating **Bosch** cordless DIY power tools is now more user-friendly and cost-effective with its innovative 18V 2.0 Ah Lithium-Ion Battery Pack, which is compatible with the entire range of Bosch DIY 18V 'Power4All' cordless tools.

The Bosch 18V 2.0Ah Lithium-Ion Battery Pack can be purchased individually or with one of the tools in the Power4All range.

Bosch DIY Power Tools brand manager Robert Cameron-Smith said, "The Lithium-ion (Li-ion) batteries are 60 per cent smaller but is packed with 33 per cent more run time, compared to nickel cadmium (NiCd) batteries."

Li-ion technology also ensures that the Bosch 18V 2.0Ah Battery Pack is ready-to-use. Even after four months on standby, the batteries will still hold 85 per cent power, if fully-charged beforehand.



Bosch battery pack

## Atlas Copco gensets to serve rental, mining and energy operations

The **Atlas Copco** QEC 1250 containerised generator has been expanded by new models - QEC 800 and QEC 1000, designed for multi-drop, prime power and critical

standby applications for the rental, mining and oil and gas industries.

Customers can tailor their QEC gensets to individual key requirements such as power output and noise suppression. A host of factory-mounted and retrofit options like digital AVR, a coolant heater, an air shutdown valve and customised colours allow the configuration.

All QEC models come in a standard ISO CSC container to facilitate transportation to the most remote worksites. Forklift slots and lifting eyes are integrated for swift onsite manoeuvring. Components including a Leroy Somer alternator and Cummins engine ensure reliability and performance and the design and production ensures longer lifespan and a high resale value.

Additional maintenance features include heavy-duty dual stage fuel and air filtration, a dedicated door for easy cleaning of the engine coolers and directly accessible power cable connections.



Atlas Copco QEC 1250 for quarrying

## Cat Propulsion adds azimuth to integrated tugs

**Caterpillar Propulsion** launches fresh range of azimuth thrusters targeting the tug market, developed to match the highest performance with the most competitive cost, the company has announced.

The 60-tonne bollard pull Cat Propulsion Marine Thruster Azimuth (MTA) is the first model in what will become a new family of rotatable units optimised for tug operations, with an initial unit expected to be delivered into a commercial trial by the end of 2015.

The new MTA range has been tailored to optimise performance when working as part of an integrated propulsion train and will be made available through the Cat dealer network. The complete package for tugs will include engines, high speed shafting, controls and clutches. The MTA's consoles will display and control engine and thruster functionality.

Caterpillar Propulsion general manager Jim Johnson said, "This MTA is a key component in our concerted drive to bring the twin benefits of performance excellence and economy to the tug market. The harbour tug sector is intensely competitive, but it is also a market that will benefit in terms of bollard pull and reliability from a consolidated package where component parts are optimised to work together."

Caterpillar Propulsion has made simplified installation and easy access for maintenance priorities as part of the new thruster development.

## YelloGen

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# Power

## Faulhaber's flyweight packs a heavyweight punch

In the fight for high performance with minimum weight, **Faulhaber**, with the development of its series 3274 BP4, has put a new champion in the ring. The brushless DC servomotor, measuring 32mm in diameter and 74mm in length, has a huge continuous torque of 165mNm. Furthermore, it weighs in at just under 320g, which is half that of conventional motors with comparable power.

The four-pole brushless DC servomotor is ideal for applications in which high power and dynamic start/stop operation with the lowest possible total weight is an important factor, for example in link drives of humanoid robots, electric grippers used in process automation or high-performance traction drives used in inspection robotics.



The Faulhaber series 3274 BP4 is equipped as standard with digital hall sensors

The 3274 BP4 is overload-resistant and operates without wear-prone mechanical commutation. As a result, its operational lifetime is many times longer than that of a conventional DC micromotor. The slope of the motor characteristic curve is just 3rpm/mNm with a stall torque of 2.7Nm. The 3274 BP4 can deliver whatever the application demands even under the harshest ambient conditions such as at low temperatures or high mechanical loads (e.g. in aerospace applications). This is made possible by, among other things, robust stainless steel housing and the omission of adhesives, which are otherwise used for assembly.

One particularly interesting feature of this motor series is the high flexibility in its design. The Faulhaber series 3274 BP4 is equipped as standard with digital hall sensors. High-resolution optical and magnetic encoders can be attached simply to the rear multifunction flange. As an option, the motor is also available with analogue (linear) hall sensors that can replace an encoder in many application cases. Finally, a large selection of performance-optimised precision gearheads rounds off the complete drive system.

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## A great engine in a small package

**Kohler Engines** has launched the KDI 3404, a new 3.4l engine that reaches 100kW and 500Nm despite its extremely compact size. The KDI 3404 model completes the platform of KDI diesel engines. The KDI series ranges from 30 to 100kW, with three different engine sizes — the 1.9L the 2.5L and now the 3.4L. The decision to use cutting-edge technology ensures all the models meet current emission standards without the use of a particulate filter. This is made possible by the high-pressure



The new KDI 3404 by Kohler Engines was developed according to the 'best fit' principle

common rail injection system (2,000 bar) offering extremely clean combustion when it is combined with four valves per cylinder, with G35 solenoid-type injectors for an extremely precise supply of fuel during the injection process and with the use of an electronically-controlled EGR valve for the recirculation of the right amount of exhaust gas, liquid cooled by a water/air heat exchanger. The range of KDI 3404 engines by Kohler Engines is completed by mechanical versions that offer an excellent performance and are ideal for applications and markets where the emissions standards are less demanding.

The KDI 3404 reaches 100kW of power at 2,200rpm; similarly, it reaches 500Nm maximum torque at 1,400rpm. These values rank among the 'best in class' in their target segment and are matched by their high torque reached at minimum rpm: the KDI 3404 reaches 412Nm at just 1,000rpm,

enabling demanding work cycles at low rotation speeds, and so reducing fuel consumption by up to 10 per cent while significantly limiting noise levels. The perfect integration of the turbo, engine and electronic control unit guarantees an immediate response to variations in load, yet another benefit for productivity and operating fluidity, and enabling 15 per cent higher levels of machine productivity compared to leading competitors.

The KDI 3404 also offers maximum efficiency in terms of the cost of ownership: minimum guaranteed maintenance intervals of 500 hours due to clean combustion without the need for a particulate filter.

The innovative injection system in KDI 3404 by Kohler Engines with a high-pressure common rail system four valves per cylinder, fixed geometry turbo and EGR valve, make it possible to reach standards of performance that are usually seen with higher displacement engines (specific power: 30kW/l; Specific torque: 150Nm/l). As a result, OEMs can replace the higher displacement engines in their projects with versions that have a considerably smaller footprint to reduce consumption without necessarily redesigning their application or, in the case of new machines, designing smaller engine housings leading to improved operator visibility and better productivity and safety.

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