

# MINING & TRADE *Review*

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Mining & Business News that Matter

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## Year 2016 round up

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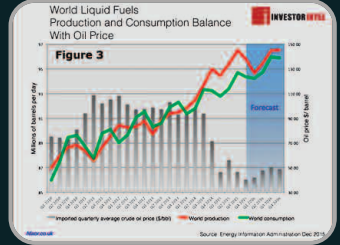
# Low prices hit mineral sector



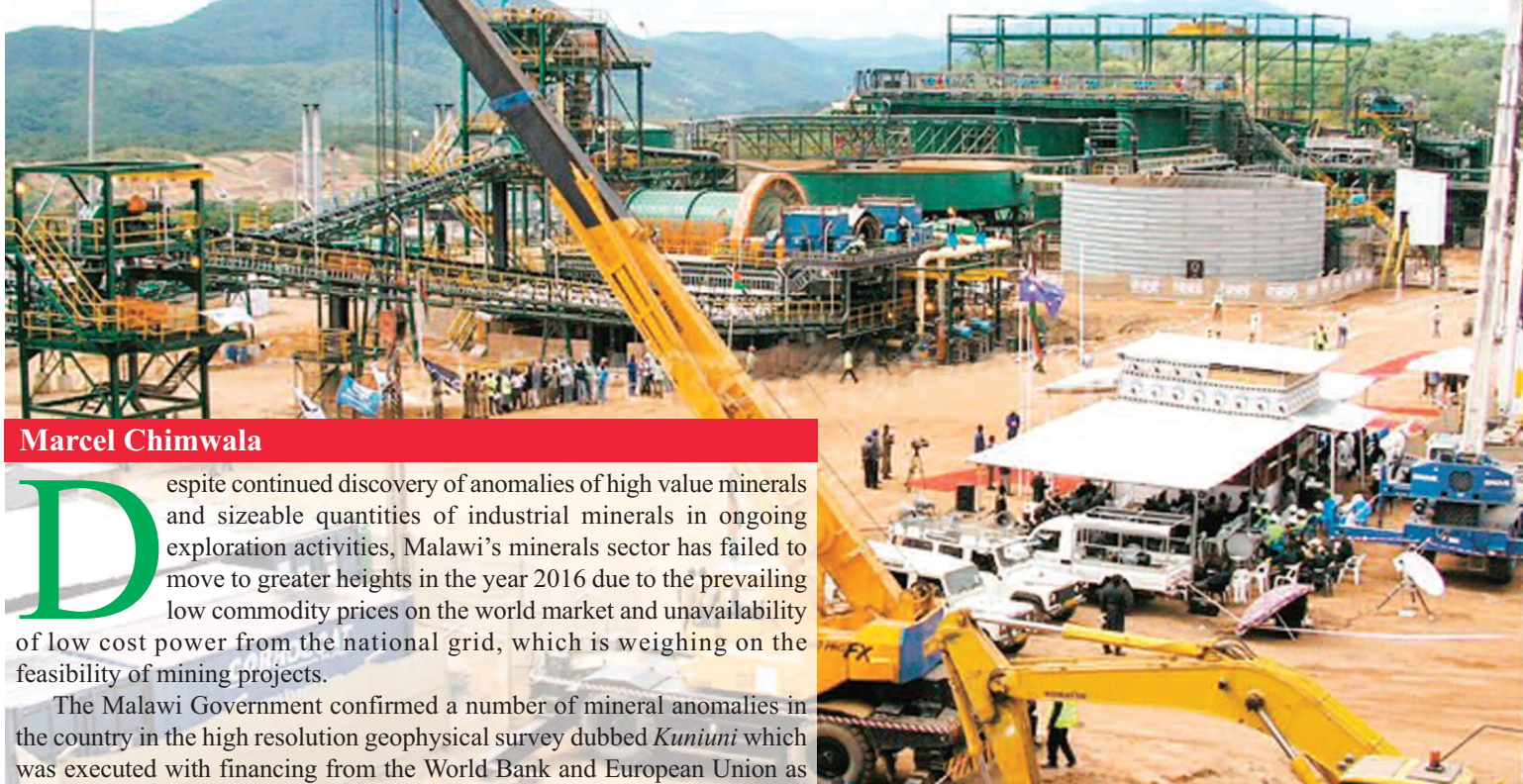
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**Marcel Chimwala**

Despite continued discovery of anomalies of high value minerals and sizeable quantities of industrial minerals in ongoing exploration activities, Malawi's minerals sector has failed to move to greater heights in the year 2016 due to the prevailing low commodity prices on the world market and unavailability of low cost power from the national grid, which is weighing on the feasibility of mining projects.

The Malawi Government confirmed a number of mineral anomalies in the country in the high resolution geophysical survey dubbed *Kuniumi* which was executed with financing from the World Bank and European Union as part of the Mining Governance and Growth Support Project. **cont. on page 3**

The mothballed Kayelekera Uranium mine

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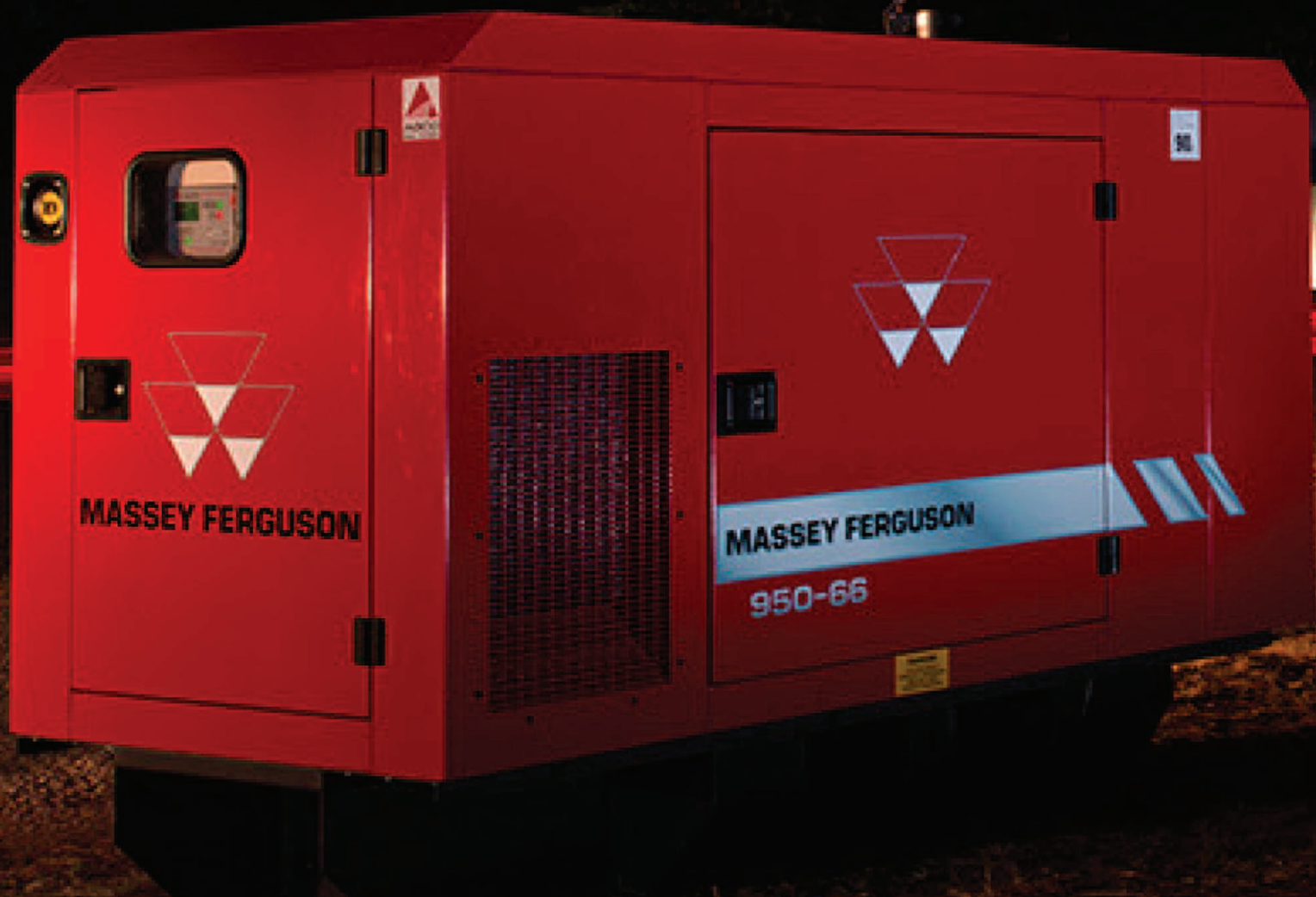
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**...from front page** Minister of Natural Resources, Energy and Mining, Bright Msaka launched the geophysical data obtained from the survey in 2015.

Director of Geological Survey Department, Jalf Salima, says the data pinpoints existence of anomalies for high value minerals including gold, platinum group metals, diamond and hydrocarbons, which enterprising investors are encouraged to follow up.

Salima also says the data confirms the existence of known deposits of minerals such as uranium, coal, heavy mineral sands and rare earths.

“For example, the Kasungu dyke and other areas where the magnetic method was used in the survey may be mineralised with chromium, Nickel, PGE, Copper and cobalt but requires follow up with ground geophysics and drilling to obtain samples,” he says.

The other revelation from *Kauniuni* is that the Kayelekera deposit, where Australian group, Paladin Africa, was mining uranium maybe bigger than earlier mapped out.

“Uranium concentration is high outside the mining area and there are some uranium anomalies further south which call for more ground follow ups,” says Salima.

The survey data also reveals that the Lower Shire Basin is mostly concentrated in the west of Ngabu fault and has a thickness of up to 9000 metres within the threshold of petroleum formation of at least 1500 metres.

The Malawi government is, currently, selling the data to interested investors but industrialists say there is low investor interest in mineral exploration activities at the moment because of the prevailing low commodity prices on the world market.

The low commodity prices resulted in the mothballing of the Kayelekera Uranium Mine following the Fukushima Nuclear Disaster which resulted in the closure of nuclear plants in Japan.

Depressing prices of commodities have also had a knock on effect on the start of mining at Malawi’s advanced exploration projects, which include Kanyika Niobium, Kangankunde and Songwe Hill Rare Earths.

A narrative report on the Kayelekera Uranium Mine presented by mineral sector consultant Grain Malunga and a member of the civil society advocating for sanity in the mineral sector, Rachel Etter-Phoya, at German-based consultancy OpenOil financial modeling training in Berlin in October indicates that Kayelekera needs the current price of uranium to more than double to be able to reopen profitably.

The report reads: “The uranium spot price for October 2016 is US\$20-US\$26 per pound while the model shows a breakeven price of US\$20-\$58 per pound. When Kayelekera opened in 2009, the average uranium spot price for the three preceding years was US\$70 per pound.”

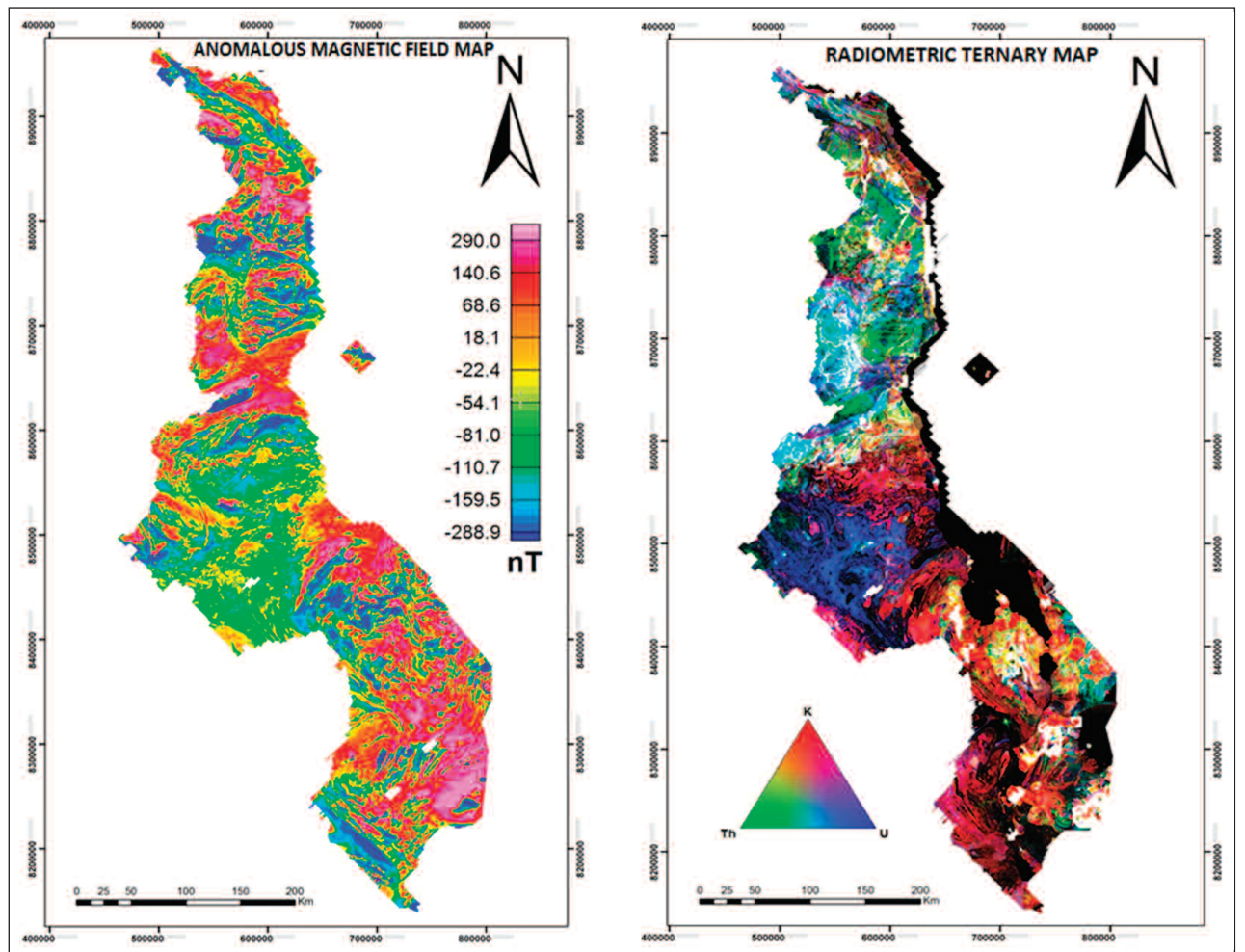
“Paladin Africa has lost US\$387 million to date because of the uranium price slump and the high operating costs related to electricity access. At present, operating costs are US\$13-US\$19 per lb more than the average global spot price for October.”

Paladin Africa, which also runs the Langer Heinrich Mine in Namibia, is currently conducting a feasibility study to reopen Kayelekera and, according to the company, one of the factors that is weighing heavily on resuming production is the use of diesel generators to power the mine’s operations which is more expensive as compared to use of power from the national grid.

Malawi is, currently, experiencing a power crisis due to low generation capacity attributed to low water levels in the Shire River, which hosts the country’s hydro-power generation plants.

Market analysts, however, still remain optimistic that Kayelekera will come back on stream in the near future as the world’s focus is shifting to nuclear energy as a clean source of fuel and more nuclear plants are set to open in China and India in the near future.

There is also optimism on the rare earth front as Minister of Natural Resources, Energy and Mining, Bright Msaka, said when he graced the European Union funded



Hi-Tech Alkcarb Expert Council meeting in Zomba that the government expects rare earths to become a key driver of the country’s economy in the near future considering their growing importance.

“I understand that rare earths have diverse uses in high tech applications as they are important ingredients in permanent magnets, electric vehicles and consumer electronics. With these industries growing, the world market will definitely need Malawi’s rare earths and this is what attracted the Hi-Tech Alkcarb Project to focus on Malawi,” he said.

Malawi is also optimistic that the Kanyika Niobium Project will come on stream in the near future as currently discussions between the developer, Australia’s Globe Metals & Mining and potential off-take partners are still

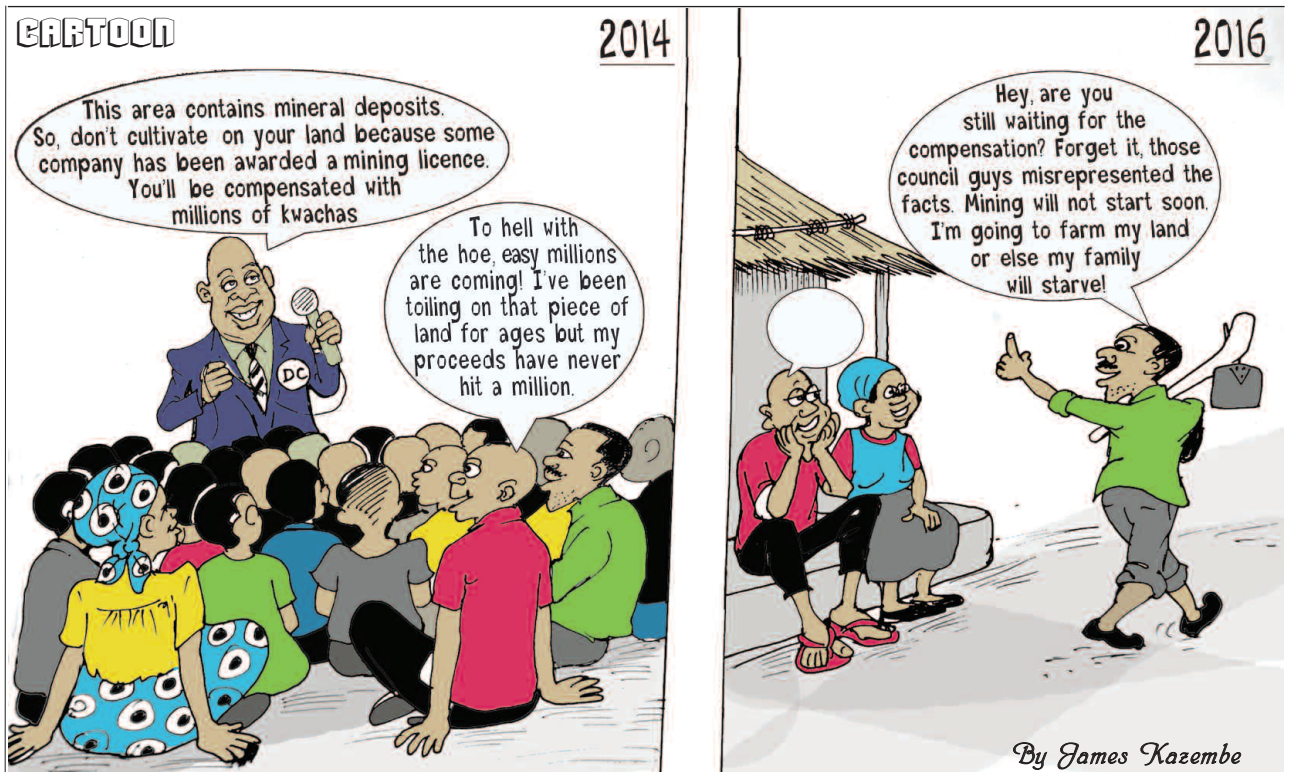
going on.

Globe Metals & Mining finalized a feasibility study including a bulk sampling study at Kanyika and is currently courting financial partners to kickstart mining.

Meanwhile, delays in the commencement of mining at Kanyika has negatively affected members of the local community who were in 2014 advised by the local government authority to relocate and stop cultivating their crops at the site to pave way for mining to start.

After years of waiting to be compensated, the communities have opted to resume their day to day activities at the site.

The contribution of mining to Malawi’s gross domestic product, which rose to above 3% when the Kayelekera Uranium Mine was on stream, has declined to a staggering 1% ■



By James Kazembe

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# Top Service Providers to Malawi

For Malawi's budding minerals sector to grow, it needs the support of efficient service providers. As the year 2016 comes to an end, through research conducted over the year, *Mining & Trade Review* has come up with a list of service providers which are leaders in the provision of products and services to the minerals sector. These include financial institutions, contractors, cement suppliers, equipment suppliers, telecommunication operators, minerals sector consultants and travel consultants.

## FINANCIAL INSTITUTIONS



### Standard Bank

Standard Bank remained the leading bank for Malawi's minerals sector in 2016. The Bank boasts of the capacity to arrange financing for the capital intensive mining projects due to its strength as a major African bank, rich history in mining and connections with major global financial centres.

Standard Bank, which is the largest African bank with a strong presence in Malawi, is one of the few banks in Malawi with a fully dedicated investment banking team. It aspires to be the leading corporate and investment bank in, for and across Africa with a deep specialization in natural resources.

The Bank's offering to corporate clients comes in three specialist areas namely global markets, transactional products and services and investment banking.

In 2012, Standard Bank was one of the syndicate banks which provided US\$180-million in project finance for Paladin Africa's Kayelekera Uranium Mine in Northern Malawi.

Standard Bank Malawi has established relationships with correspondent banks in all major currencies which enable smooth transfer of funds internationally. As part of the Standard Bank group, the Bank is able to leverage off its long standing presence in the international banking system as well as the strategic partnership with the Industrial and Commercial Bank of China.

#### Contact Details:-

Standard Bank Centre  
African Unity Avenue, City Centre  
P.O. Box 30380, Capital City, Lilongwe 3, Malawi.  
Tel: +265 (0) 1 774 688 / Fax: +265 (0) 1 771 353



### Nedbank

In 2016, Nedbank showcased its growing interest to support the minerals sector in Malawi when it flew one of the key players in the sector, Shayona Cement, to the annual Mining Indaba in Cape Town, South Africa, which took place in February.

Nedbank Group through its investment arm, Corporate and Investment Banking unit, is one of the major players when it comes to backing key mining projects across Africa. Some of the landmark deals that the bank has successfully pursued on the continent include: Aureus Mining's Liberty Gold project in Liberia where Nedbank together with RMB, provided \$100-million worth of debt financing; \$150-million to First Quantum Minerals, which mines copper in Zambia; \$25-million debt package for the development of Gem's Ghaghoo diamond mine which is Botswana's first underground diamond mine, plus many more numerous deals. In Malawi, Nedbank was one of the Banks that financed development of the Kayelekera mine.

#### Contact Details:-

Nedbank Malawi Limited Head Office  
Private Bag 750, Blantyre.  
Tel: +265 1 820 477/Fax: +265 1 820 102

## CEMENT SUPPLIERS



### Shayona Cement Corporation

Shayona Cement Corporation is not only known for its quality strong brands of cement but it is also famed for using a large proportion of locally sourced raw materials in the cement manufacturing process. Shayona Cement Corporation has consolidated its position among the market leaders with a major expansion project involving the construction of a new state of the art cement manufacturing plant at its Kasungu factory located in Traditional Authority Wimbe's area underway.

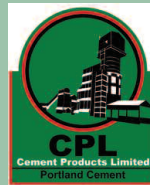
Shayona Cement's Akshar Cement caters for over 25% of the market share for cement in the country and is expected to take up to 80% of the market share when the new rotary kiln plant is commissioned.

In the year 2016, Shayona launched a new cement brand called Thathwe and touted the cement's attributes for being more superior than any cement on the market. The company also re-launched the buildplast cement brand.

Shayona's brands are playing a key role in the industry as they are been used to construct different infrastructure that mining companies construct as part of corporate social responsibility programmes including school blocks, houses, boreholes and bridges.

#### Contact Details:-

Shayona Cement  
P.O. Box 679, Lilongwe, Malawi  
Tel: +265 (0) 1 752 791/Fax: +265 (0) 1 752 909



### Cement Products Limited

Cement Products Limited is one of the newest cement producing companies in Malawi but within a short period, its operations have gained a mark on the Malawi market. The company, with its new head office at Chirimba in Blantyre, is constructing a clinker plant. Its ambition is to stop importing clinker in the medium term.

Cement Products will be producing clinker using limestone that it wants to mine at its Mangochi licence area.

The company is popular with its Njati Cement Brand.

#### Contact details:-

Cement Products Limited  
P.O. Box 241, Blantyre.  
Tel: +265 (0) 1 683 958/Fax: +265 (0) 1 683 758



### Lafarge Holcim Malawi

A subsidiary of SIX Swiss Exchange and Euronext listed world's largest manufacturer of building materials, La Farge Holcim Malawi is the oldest cement manufacturing company in Malawi.

In the year under review, the company commissioned a newly-procured state-of-the-art cement bags filling machine, a 6 spout, 3rd generation German-made Haver and Boaker Roto packer at an event held at its premises in Makata Industrial area, Blantyre.

The packer has the capacity to pack different weights, such as 25kgs, 50kgs as well as bulk deliveries, a development that has proved convenient to varying customers.

The technology that was used to create the packer also equips the machine with a self-weight correction mechanism, which ensures that the bag is delivered fully to the required weight.

For instance, if a 50kg bag is not full to its weight, the machine will detect and reject it until the packing is done appropriately. The machine is also environmentally friendly as it has a mechanism that reduces emission through a fan that sucks dust from the bag before going into the truck.

La Farge Holcim Malawi is well known for its two brands of cement namely Kumanga and Portland.

#### Contact Details:-

Lafarge Holcim Malawi  
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Tel: +265 1 871358

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Farming & Engineering Services is also offering to the industry heavy duty generators capable of meeting the power demands of major power consumers that make up the industry.

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### Equipment and Parts Suppliers Limited

Equipment and Parts Suppliers Limited (EPS) supplies equipment for industrial mining, construction equipment and are also spare parts distributors. The firm is also specialized in irrigation, industrial diesel engines, under carriage and ground engaging tools. Official distributor for Lister Petter and Monopumps, and agent for FRAM, EPS, among other products, supplies gensets and water pumps.

#### Contact Details:-

P.O. Box 553, Lilongwe, Malawi  
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### Camco Equipment

Camco Equipment is another major service provider in Malawi's mining, agriculture and construction industries as it supplies assorted equipment including backhoe loader, vibratory road roller, bulldozer, front end wheel loader, hydraulic excavator and grader.

#### Contact Details:-

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**EDITORIAL**



BY MARCEL CHIMWALA,  
PUBLISHING EDITOR

**Overcome the power crisis to attract mining investors**

Malawians will have to remember the year 2016 for the positives and negatives. On the positive note, it is the year when Malawi hosted the second investment forum in the month of October.

It is also the year when the Ministry of Natural Resources, Energy and Mining launched the Geological Mapping and Mineral Assessment Project (GEMMAP), which is set to produce updated maps depicting the mineral potential of Malawi.

More important still, in October 2016, Malawi hosted the all important expert council tour and meeting for the European Union funded Hi-Teck Alkarb project team which conducted a research on rare earth exploration on the Chilwa Alkaline Province in the southern region.

All these activities bear testimony to the fact that Malawi is serious in attracting investment in mining and other related sectors.

However, as many investors said at the Malawi Investment Forum, which was held at Bingu International Convention Centre in Lilongwe, there cannot be mining without power.

It is, therefore, imperative for the government to substantially invest in power projects if Malawi is to realize its dream of attaining economic prosperity through mining as latest mineral exploration reports show that the country has sizeable quantities of minerals including rare earths in the Chilwa Alkaline Province, which hosts of several proven deposits such as Kangankunde and Songwe Hill.

There are also deposits of heavy mineral sands in Chipoka area along the shores of Lake Malawi which could be developed if adequate power was available to the industry.

As noted in our main article, one of the reasons why Paladin Africa suspended mining at Kayelekera is that with the subdued price of the yellow cake on the world market, it became expensive for the company to maintain operations using diesel generators as it was not possible to tap power from the national grid due to the prevailing power deficiencies.

This shows that the power crisis in Malawi is proving harmful. Therefore, we would like to see projects such as the Mozambique-Malawi power interconnector and construction of power stations such as Lower Fufu, Mpatamanga, Kammwamba, Kholombidzo and Songwe fast-tracked.

We wonder that some of these projects have been on the drawing board for years of different government administrations so what is failing their take-off?

Definitely, it should be lack of seriousness on the part of government to implement the projects so if the government is not showing seriousness to implement such important projects, can the investors be serious?

Certainly, in 2017 we need a government that has the zeal to implement power projects. If cooperating partners have helped Malawi to build other infrastructure such as the national stadium in Lilongwe, the new parliament building and the Karonga-Chitipa road, what can fail them to help us develop electricity if we are serious?

Let 2017 be the year of action not rhetoric. We can host parties for the so-called investors in the name of investment forums for years but they will be far from investing their money in Malawi if we fail to address the investment hurdles notably the power crisis ■

**EYE ON MALAWI'S**

**EITI** Extractive Industries Transparency Initiative

By Rachel Etter-Phoya



*Examining Malawi's journey towards EITI compliance*

**Malawi, Mining and the Sustainable Development Goals**

The Sustainable Development Goals (SDGs) and 2030 Agenda were endorsed by Malawi along with 192 other United Nations member states in 2015. What do the SDGs have to do with mining, you may ask. Well, the 17 goals (shown in the image) that build on the Millennium Development Goals, seek to guide global action for social inclusion, environmental sustainability and economic development. Mining has the opportunity to contribute to this and is already doing so in some countries and areas. However, historically, the extractive industries, particularly in this region, have too frequently exacerbated inequality, and caused environmental harm and social disruption.

The sector remains small in Malawi but there are expectations that it will grow in the long-run. The commodity price boom in the early 2000s was coupled with anticipation that mining could contribute as much as 20% to the country's GDP (see for example the 2013 Mines and Minerals Policy) given the increased activity in exploration and the start of the first large-scale mining project, Kayelekera Uranium Mine. At present, mining revenue contributes less than 1% to GDP (as outlined in the Ministry of Finance's Annual Economic Report 2016) but it is pertinent to think ahead about how the country's finite natural resource wealth (minerals and potentially oil and gas) can be used to drive much needed change, aligned with our national and international development agenda. Diverse stakeholders are already working together, through initiatives such as the Extractive Industries Transparency Initiative, to establish the necessary framework and mechanisms to ensure mining and associated revenue contributes to national and sub-national development.

To help government, companies, civil society and residents in mining communities discuss how mining and exploration companies can support the achievement of the SDGs, the World Economic Forum, the Columbia Center on Sustainable Investment and the United Nations Development Programme produced a White Paper, "Mapping Mining to the Sustainable Development Goals: An Atlas" in July 2016.

The Atlas – which is worth a read for its large number of case studies of good practice – points out that the large-scale mining industry has the potential to contribute to all 17 goals with some common opportunities for companies despite differences in local context and phase of mining activities. In particular, "If companies are looking for a place to start, the goals of social inclusion, environmental sustainability and economic development highlight some SDGs that might be opportunities for many mining companies" (p3).

This includes ensuring the responsible management of the environment to help realise the goals on clean water and sanitation, life on land, energy access and sustainability, and climate (SDGs 6, 15, 7 and 13 respectively). Mining can be used to improve social inclusion by addressing poverty and reducing inequality and can contribute to ensuring SDG 16 on peace, justice and strong institutions is supported through avoiding and resolving conflict between the company and communities, upholding human rights and supporting community representatives in decision-making. Positive contributions to economic development influenced by mining can happen at all levels including through infrastructure development that is useful beyond the mining project, by opportunities for work and human resource development, and through the way minerals are produced and consumed, such as phosphate and micronutrients for fertilisers and rare earths in technology for a low-carbon economy.

Most companies in Malawi, like Mkango Resources and Sovereign Metals, are in the exploration phase which means they are trying to discover an area where it will be profitable to take a resource out of the ground. To do this, they have to undertake very costly activities like surveying, sampling and testing, and they are under pressure to make a good discovery so that a mining project can start, make a profit, and the initial investors who took the risk by spending money on exploration can be rewarded for this. Even at the exploration stage, community engagement is vital and companies can contribute to the SDGs. For example, the Atlas shows how exploration companies can make an effort to ensure jobs are generated for people in the host country, health and safety standards are applied and good systems are in place for community representatives to meet with and discuss developments with the company.

I recommend reading the "Mapping Mining to the Sustainable Development Goals: An Atlas" (July 2016) for yourself. Download it here [http://www3.weforum.org/docs/IP/2016/IU/Mapping\\_Mining\\_SDGs\\_An\\_Atlas](http://www3.weforum.org/docs/IP/2016/IU/Mapping_Mining_SDGs_An_Atlas) ■



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# World Bank-funded Mineral Rights

● Cadastral system expected to roll out by June 2017 ● Automate

By Chiku Jere

The Department of Mines has confirmed that the World Bank-funded modernised Mineral Rights Management System (MRMS), that Malawi is developing through Canada-based computer programming consultants, Spatial Dimension, is taking shape, and is expected to be up and running by June 2017.

*Mining & Trade Review* learnt about the development of the new computerised mining cadastre system, FlexiCadastre, during the workshop which was recently held at Golden Peacock Hotel in Lilongwe where stakeholders were taken through the Prototype MRMS and updated on the project progress.

In his welcoming remarks, Department of Mines' Director Atileni Wona described the system as significant saying it will enhance transparency and accountability in the management of the mining sector.

"I am glad that we have reached this far in moving towards fulfilling this landmark achievement. It will be a great day for transparency when we finally launch this important facility!" He said.

In his presentation, Spatial Dimension's Senior Consultant Charles Young demonstrated to the participants the Prototype MRMS noting that the system will be implemented by June next year.

"We have already completed several phases of the project and we are currently focusing on the design and implementation phases," he said.

The FlexiCadastre MRMS is a browser-based solution that will enable access to mining information at a click of a button in so doing simplifying the way mining and fiscal transactions are done in the country.

"All necessary mining transactions from licence application to revenue transactions will be managed through the MRMS. It will provide a convenient way of doing business while in the comfort of one's preferred location," he said.

Young said that the project deliverables will include a back office MRMS, an online License Map Portal and online License Management Portal which will allow government, license holders and other stakeholders like the civil society and the public to easily monitor obligations and overall management of mineral resources.

He said by interrogating the information in the system, stakeholders in the mining sector will be able to extract important data that can help in the development of relevant reports pertaining to issues of governance of the sector.

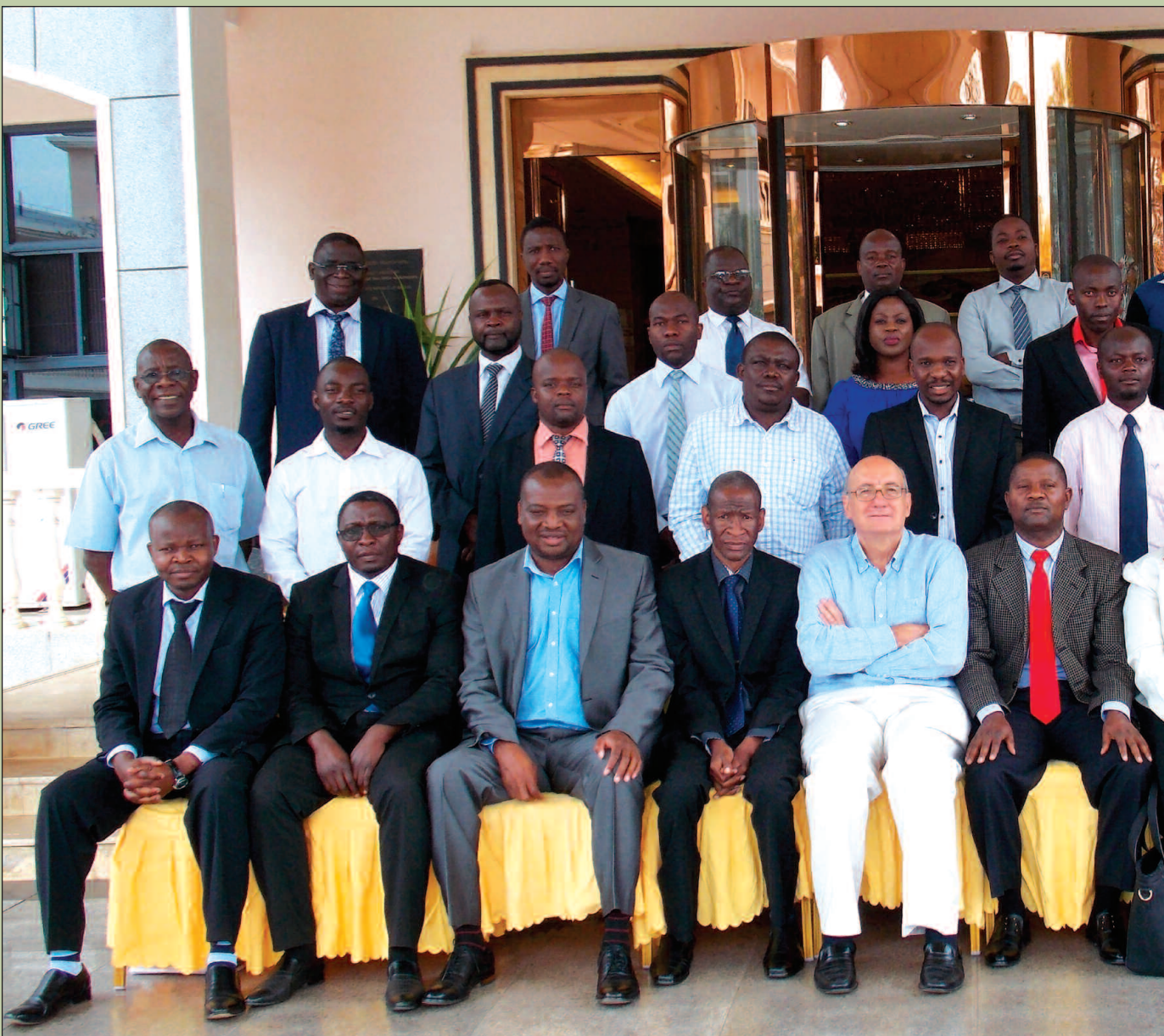
"The system is all about transparency and accountability and it will contribute positively towards the country's commitment to achieving the Extractives Industry Transparent Initiative (EITI) Standard requirements," he said.

He also said that the system is a tool that will reduce corruption or any underhand dealings.

"The MRMS is fool proof and secure. It keeps track of every transaction and records all activities performed by the cadastre officers. Above all, no one can short-cut the MRMS because it records and denies any improper input," challenged Young.

He said this will prevent any sort of manipulation, favouritism and corruption when awarding licences.

"It applies the "first in/first assessed" principle, meaning



Participants at the cadastre workshop in Lilongwe

whoever applies for the licence first will be awarded the licence should they meet the minimum and technical financial criteria. No preferential treatment and no back door dealings; something that will improve resource governance," he said.

Senior Mining Engineer and Head of Mineral Rights Section at the Department of Mines, Gibson Nyirenda, hailed the development of the new MRMS describing it as an all-important undertaking which will transform the management of the mining sector.



Wona: MRCS will enhance transparency



Young: Cadastre system helps curb corruption



Julius Chisi: Explained mineral



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# Management System takes shape

## ed operation to improve transparency in sector



“This will see all the data about mining transactions being conveyed into a cadastre pack (an online computerised system) conveniently accessible to all,” said Nyirenda.

He explained that such a development will ensure good



land survey system Nyirenda: The system to provide 24/7 access

data management, and enhance data quality, hence boosting investor confidence and promoting investment in the Malawi mining sector.

According to Nyirenda, the system will provide license holders and other stakeholders 24/7 access to detailed information about their license portfolio which includes license history, upcoming payments and reports, and will



Msaka: Cadastre system will transform the mining sector

help to create efficiency by allowing companies to fulfil their legal obligations by making online payments for fees due and submitting required reports.

“On the part of government, this will make revenue collection easier while companies will be provided with an oversight auditing history that will also simplify the task of

resource management. This will not only ease government officers’ workload but also remove the bureaucratic inconveniences that have previously ended up frustrating wilful investors.

“So as you can see, this new system is a game-changer that will make the mining sector more attractive, eventually leading to much needed investment that may end up transforming the country’ economic fortunes given Malawi’s resource potential.

The old system has many disadvantages among them; lack of central system to record applications that are mainly submitted at Head Office in Lilongwe or the two Regional Offices in Blantyre and Mzuzu, by hand or post.

The old manual system also delayed business as mining license claims and applications received at regional offices were not immediately sent to the Head Office because of cost implications and were delayed for two or more weeks so that the office should have several applications to send together.

Currently, it is also complicated and time-consuming to manage licence application process manually, resulting in a backlog of applications.

However, the new system addresses all these hurdles and although it is designed on the current Laws and Regulations, it is poised for reconfiguration upon the enactment of the revised Mines and Minerals Bill which is



Young taking participants through the workshop

gathering important information into the their data bank,” he said.

Apart from enhancing transparency and accountability, Nyirenda said the installation of the system will play a great role in easing the conduct of business in mining sector.

For instance, he said, the system will integrate all of mining sector’s legal business processes, turning itself into an obligation monitoring tool for government, civil society, the public as well as investors.

The new system is designed to provide functions like accurate capture of data and validation of license overlaps on application hence reducing possible conflicts with licences and restricted areas.

“The MRMS manages the licensing process from application to expiry. It notifies up and coming renewals and expiries, allows for revenue tracking, management and reporting as well as generates official documents and reports, which ensures full data monitoring and auditing,” he said.

Furthermore, the system integrates the regulatory, institutional and technological aspects relating to tenement administration forming the cornerstone of good mineral

pending for tabling in parliament.

Minister of Natural Resources, Energy and Mining Bright Msaka says the development of the cadastral system is one of the steps the government is putting in place to transform the mining sector, which has been identified as one of the key priority areas that can foster sustainable economic growth.

“In this regard, the current Government, through the dynamic leadership of His Excellency, Prof. Arthur Peter Mutharika, President of the Republic of Malawi, attaches strong commitment to ensuring the growth of the mining sector through various deliberate initiatives which are aimed at establishing a conducive investment environment in the mining sector,” he says.

The other initiatives that the government is undertaking to develop the minerals sector include the geological remapping programme which Msaka launched earlier this year, ongoing review of archaic laws including the 1981 Mines and Minerals Act and development of an artisanal and small-scale mining policy.

The World Bank and European Union are financing the development of the cadastral system as part of the Mining Governance and Growth Support Project ■





# TECHNICAL FILE

by Grain Wyson Phillip Malunga FIMMM  
Mining and Environmental Management Expert

## The Cement Industry and People issues in Malawi

### Abstract

Cement manufacturing and other construction projects are affected by complex accounting due their belonging to quarrying and manufacturing. Local communities will look at these projects as mining in nature and therefore will seek more benefits associated with mining. It is important to come up with reasonable levels of community benefits as quarrying for cement manufacturing involves low value minerals such as limestone and clay.

### Cement Production Process

Cement manufacturing is a process of combining primary raw materials from quarrying to produce a mineral mixture called clinker that can be ground into powder with specific chemical composition and physical properties called cement (Figure 1). The process begins with extraction of raw materials such as limestone, silica, aluminates and ferric minerals. Aluminates include shale, clay, slags, fly ash, bauxite and granite. Silica comes from sand, clay, claystone, shale, slag, and fly ash. Ferric materials come from iron materials such as iron ores, blast furnace flue dusts, pyrite clinker fly ash.

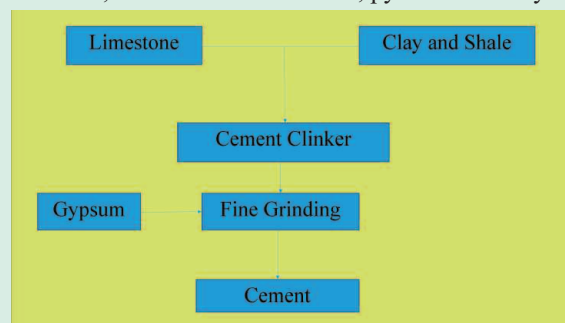


Figure 1: Cement Raw Materials

The above raw materials are heated in a kiln to extremely high temperature, up to 1500 °C using fuel such as thermal coal. Other sources of heat include natural gas and heavy oil. Table 1 lists just some of the many possible raw ingredients that can be used to provide each of the main cement elements.

Table 1: Some Raw Materials for Cement Manufacture

Calcium	Silicon	Aluminium	Iron
Limestone	Clay	Clay	Clay
Marl	Marl	Shale	Iron Ore
Calcite	Sand	Fly ash	Mill scale

Raw materials required for this exercise should contain very little metallic elements magnesium, sodium, potassium, strontium as they will not burn off in the kiln and will negatively affect the cement quality. In order promote reactivity of the materials their chemical structure and fineness matter hence preference of clays being a good source for silica and alumina. The raw mix is usually 70% limestone and 30% clay.

A small amount of calcium sulphate (3 percent to 5 percent) is added to the clinker to control setting of cement. This is done before fine grinding in a grinding mill. This mineral can be in form of anhydrite (CaSO<sub>4</sub>), hemihydrate (CaSO<sub>4</sub>·1/2 H<sub>2</sub>O) and gypsum (CaSO<sub>4</sub>·2H<sub>2</sub>O). The Other additives may be added in varying proportions to give cement specific properties such as reduced permeability, greater resistance to sulphates and aggressive environments, improved workability, or higher-quality finishes. Table 2 shows typical chemical composition for clinker and Cement.

Table 2: Chemical Composition for Clinker and Cement

Clinker	Mass%	Cement	Mass%
Tricalcium silicate (CaO) <sub>3</sub> ·SiO <sub>2</sub>	45 – 75	Calcium oxide, CaO	61- 70
Dicalcium silicate, CaO <sub>2</sub> ·SiO <sub>2</sub>	7 - 32	Silicon oxide, SiO <sub>2</sub>	19 - 23
Tricalcium aluminate, (CaO) <sub>3</sub> ·Al <sub>2</sub> O <sub>3</sub>	0 - 13	Aluminium oxide, Al <sub>2</sub> O <sub>3</sub>	2.5 – 6
Tricalcium aluminoferrite, CaO <sub>4</sub> ·Al <sub>2</sub> O <sub>3</sub> ·Fe <sub>2</sub> O <sub>3</sub>	0 - 18	Ferric oxide, Fe <sub>2</sub> O <sub>3</sub>	0 - 6
Gypsum, CaSO <sub>4</sub>	2 - 10	Sulfate	-

Effort should be made to put the cement plant within the vicinity of the limestone deposit and clay to be situated not more than 25 km from the plant.

### Factors affecting performance of cement industry

There cement industry is affected by the following factors:

Economic growth of a country influences the growth of cement markets e.g. housing and infrastructure development

Profit margin for cement sales are less and there is need to have access to cheap power, high quality limestone and proximity to good markets and other raw materials.

The cement industry is very sensitive to legal and regulatory instability. Apart from environmental issues and increasing cost of production, there is need to guard against unfair competition such as “dumping” of foreign cement products

Choice of technology affects cost saving. There is need keep abreast with new manufacturing processes that can reduce cost of production up to 10% of the overall cost structure.

Geographical location of cement plants should take advantage of limestone deposit location and cheap transportation.

### People Issues

From the above discussion, it can be observed that cement production is a process that involves quarrying and manufacturing. Quarrying is mainly for extraction of limestone and clay while manufacturing is for raw material blending crushing, calcination (heating) and grinding to produce pure fine cement.

Manufacturing of cement is always thought of as part of mining. Consider grinding mills that produce cement from clinker. These are a manufacturing pieces and can survive with imported clinker. Huge structures of manufacturing plants can be misleading thinking that cement manufacturing is a lucrative business and therefore attracts people’s high expectation of corporate social responsibility (CSR) associated with mining.

Quarrying of cement and raw materials such as clay and iron ore are part of extractive industry or mining. What needs to be taken into account is the value of these raw materials and how they can contribute to local development.

Cost of cement limestone in Malawi ranges from \$2.0 to \$5.0 per tonne. This means that for a cement plant that produces 1,200 tonnes per day may consume 840 tonnes of limestone per day and about 250,000 tonnes per annum valued at about \$1.25 million. An annual royalty fee (at 5%) of \$62,500.00 will be collected. Similarly about 20% clay will be required for mixing with limestone. About 50,000 tonnes of clay per annum will be required at a cost of \$6.0 per tonne. An annual royalty fee (at 5%) of \$15,000.00 will be realised. The other government revenue will be in form of Income Tax, Value added tax and Pay As You Earn (PAYE) arising from cement manufacturing. Ground rent from the quarries may not be significant. In summary a 1200 tonnes per day plant can generate royalties to government not exceeding \$78,000.00 per annum.

The complexity in exercising transparency and accountability comes in due to non-ring fencing of these project cost centres that involve mining and manufacturing. Similarly this is experienced in rock phosphate mining and fertilizer manufacturing. Construction companies are also affected in terms of quarrying and construction where extra commercial activities in sales of aggregate may not be reported in public projects even after their completion. Activities of this nature may be viewed in general as mining with high returns raising people’s expectation in terms of high benefit sharing. It is recommended that mining for manufacturing should be ring fenced to portray two businesses i.e. quarrying company and manufacturing company. Local mining communities will not separate the two activities and may demand more benefit sharing as is obtained in high return mining projects.

### Recommendation

In order to manage people’s expectation and illicit financial flows arising from quarrying and manufacturing, it is recommended to set up a corporate entity that manages two subsidiaries; one for mining/quarrying and the other one for manufacturing. This will help protect mistrust in terms of benefit sharing arising from mining and bring compliance to normal government revenue that comes from manufacturing.

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[www.bgs.sc.uk](http://www.bgs.sc.uk)  
[www.understanding-cement.com](http://www.understanding-cement.com)  
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# Malawi's Mineral Sector in 2016



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## CONTRACTORS



## Mota-Engil

Mota-Engil is arguably the contractor involved in more works contracts in Malawi than any other big contractor. The Portuguese contractor was also engaged by Paladin Africa as a mining contractor for the mothballed Kayelekera Uranium mine in Karonga, which is so far Malawi's largest mining investment.

Mota-Engil is also involved in exploration for gold and other high value minerals in Malawi and reported encouraging results in its update of the works earlier in the year.

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Government departments, non-governmental organizations and private companies have continued to knock at the door of the Lilongwe based contractor for various water drilling solutions.

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# Oil Exploration in Malawi

## — A Positive Outlook Promotes Timely Planning

By James C. Chatupa  
Consulting Geologist



The Malawi debate on oil exploration and production is both robust and exciting, but at times confusing and aimless. There are worldwide concerns about pollution and climate change caused by the utilization of oil and coal for fuels for transport, generating electricity and many other uses. A consensus is slowly building-up on how to resolve these concerns. Some agreements have been reached at the UN-organised Paris COP21 of 2015, to reduce carbon emissions into the atmosphere.

On the other hand there appears to be some confusion of contexts in Malawi relating to oil exploration and production. The fact that government granted exploration licences had some opposition in the first place. Then the recent lifting of suspensions of exploration was greeted by further derision and accusations. On the other hand some are claiming that they have not seen any benefits from these ventures. There seems to be some misunderstandings implying that oil production is about to take place or is ongoing and they are demanding their benefits *pompompo*. This confusion of exploration for oil and production has to be loudly addressed, as it seems to be sidetracking us from making critical strategic plans and implementing meaningful programmes in the legal, economic and technological areas.

I would like to take some time to outline the trend of some of the issues, so that we can continue the debates without changing the goal posts to suit the various perceptions.

### Where is the Oil?

Malawi has not found oil yet. Malawi is just going to start to look for oil, hence the Malawi Government granted Petroleum Exploration Licences from 2011 to 2013 as stipulated in the Petroleum (Exploration and Production) Act, CAP 61:02 of 1983. That is, these are legally binding contracts between the Malawi Government and the exploration companies – there is no need to accuse each other of underhand dealings.

The knowledge that the country has, so far, is the presence of thick sedimentary rock formations under Lake Malawi, the Lower Shire Valley and the Vwaza Marshes/Lake Kazuni. This was discerned from geological and geophysical works undertaken by the Malawi Department of Geological Survey/British Geological Survey (1908 – present), UNDP-financed airborne geophysical surveys (1970/71 and 1984/5), the Duke University of the USA (Project PROBE seismic survey on Lake Malawi mid-1980s), Chancellor College of the University of Malawi (1975 – 1980) and many other research projects carried out under other government departments.

It is worth noting that Project PROBE by Duke University was funded through research grants from at least nine international oil corporations and the World Bank.

Emphasis here is that companies do actually take a long term view in these matters – they plan for 20 or more years into the future. This is a mindset change we must adopt; rather than insulting each other, that decisions are made to meet short term gains.

Oil is generated from the burial of tiny single-celled organisms that populated the ancient seas and lakes. Over millions of years sediments accumulated over the top of the dead organisms. Increasing pressure and high temperatures cooked them into hydrocarbons that form oilfields. These oilfields are presently buried both on present onshore and under seas offshore. These burials happened over 100

million years ago in many parts of the world, and many are still undiscovered. But in the East African Rift Systems (EARS) some of the burials happened about 10 to 30 million years ago – Lake Albert in Uganda is a good example, probably it was another lake before the present one developed.

### Oil Exploration

There are three main conditions that define a prospect as a potential oilfield or oil reservoir:

- the source rock rich in hydrocarbons must have been buried deep enough for subterranean heat to cook it into oil;
- a porous and permeable reservoir rock must be present for the oil to accumulate in; and
- a cap rock (seal), or other geological structure that prevents the oil from escaping to the surface (Wikipedia, April 2016) (Figure 1).

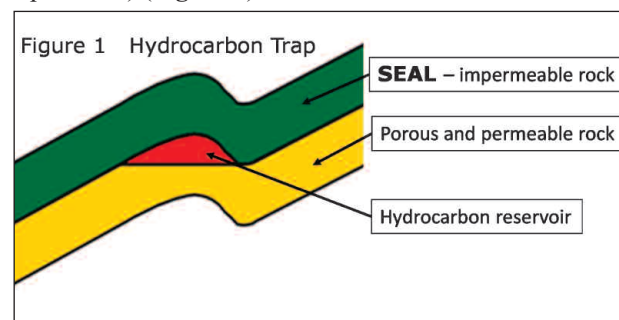


Figure 1.

In Malawi, we have the sedimentary rocks that are potential prospects, but we do not know yet if they contain source rocks that are rich in hydrocarbons hence the need for exploration to find out the three conditions stated above.

### Process of Oil Exploration and Production

Oil exploration is the first phase in a continuous cycle, as illustrated in Figure 2.

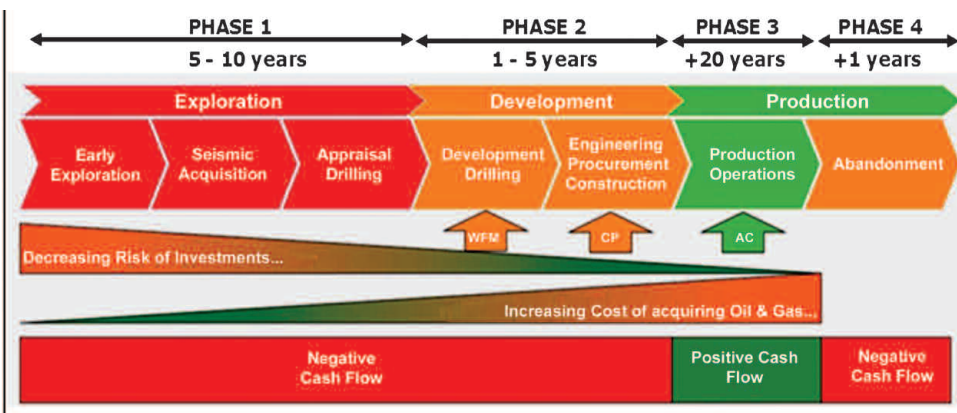


Figure 2: Oil and Gas Exploration and Production Cycle (Amab Ghosh, EMC SPARK, 2014)

The early investigations are normally carried out by government and academic institutions as part of programmes promoting investment. Multi-lateral institutions, such as the World Bank, UNDP, EU, and other governments as part of bilateral relations do often assist in meeting the costs of these early investigations.

Malawi had carried out ground geological mapping of the whole country by the mid-1970s, mainly with assistance from the British Government. This work indicated most of the geological environments and mineral potential of the country. In the introduction mention is also made of follow-up geophysical surveys and the Project PROBE seismic survey on Lake Malawi.

Oil exploration companies utilise the early work in planning and designing their more comprehensive gravity geophysical surveys and seismic investigations. The main more specific objective by the companies being the discovery of the hydrocarbon source rock and its possible quality. 3D-modelling is applied to evaluate the geological structures and other parameters that may show the possible nature of migration of the hydrocarbons as they may have

been affected by tectonic events.

Appraisal drilling and discovery often define the last stage in the exploration phase (PHASE 1). Any hydrocarbon discovery by the company has to be reported to government; as stipulated in the law. The company may then apply for a renewal of the Petroleum Exploration Licence after 4 years to undertake more drilling to further evaluate the discovery and/or to delineate reserves of the hydrocarbon resource. The renewal period is limited to 3 years, but the government has the option of rejecting the application for renewal, if it is not satisfied with the work undertaken during the first tenure.

Where the company has delineated an economic reserve, they may apply to government to be granted a Petroleum Production Licence, to carry out activities summarised in Figure 2 under Phases 2, 3 and 4.

### World Oil Demand and Supply

One of the concerns recently expressed in the press is that Malawi should not be granting oil exploration licences because of the continuing drop in oil prices on the world markets (*Pambazuka News*, 16-2-2016). Figure 3 shows the various movements in the oil market.

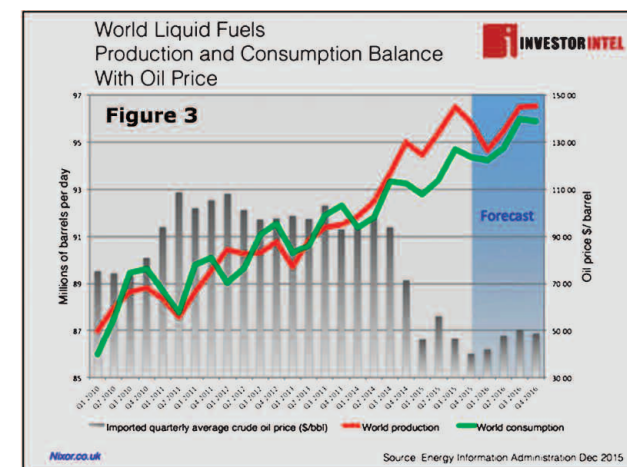


Figure 3

It is noteworthy that demand and supply of oil continue to rise, although the price of crude oil continues to be very low from December in 2014. It is clear that the price of oil is not following the normal economic principle of price influencing supply and demand. This is further complicated by the fact that oil production has been exceeding consumption from 2013. Other geopolitical factors may be at play here.

Secondly, although analysts have given varying interpretations to the oil price saga, it is historically known that the oil industry has gone through many “boom and bust” situations over the years (Figure 4).



Figure 4.

There is no such strong justification for postponing the granting of oil exploration licences due to the drop of prices on the world market. In fact the recent agreement (reported by the press on 25-4-2016) by the East African Community governments, to build a pipeline from Uganda to the Indian Ocean coast in Tanzania, gives a boost to the oil industry growth in this region. There are also active exploration programmes in Mozambique, Tanzania, Kenya, Uganda and even Myanmar, in South-East Asia. Malawi must take a positive outlook, and move on with its programmes.

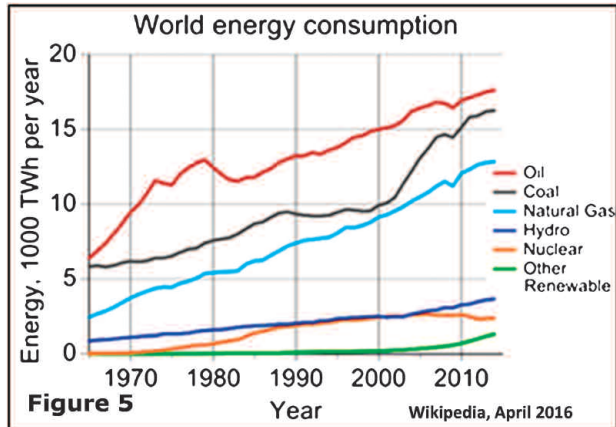


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**Importance of Oil**

A layman in Malawi can best judge the importance of oil by the number of vehicles (cars and trucks) that ply our roads on a daily basis. Petrol and diesel commodities are some of the major imports into the country. The tarmac of our roads on which we invest huge amounts of our revenues for their construction is also made from oil (hydrocarbons). The plastic pipes, various polymers and pharmaceuticals are mainly byproducts from hydrocarbons.

The oil industry is vital to many industries and it is critical to the maintenance of our modern civilisation. Oil, coal and natural gas account for a significant proportion of the world's energy consumption, as illustrated in **Figure 5**.



For the highly industrialised countries the oil and coal industries also support millions of jobs of their populations. It is also worth noting that renewables, hydroelectricity, nuclear energy are significantly low as sources for energy consumption. As part of the COP21 agreements, the International Energy Agency is placing the development of renewable energy resources as an urgent programme for scientific and technological research. Malawi may consider utilising revenue earned from oil exploration charges to promote research in renewable energy resources.

Africa consumes very little oil and coal, but a growing consumption trend is evident. It is estimated that oil consumption in the whole of Africa is still below 10 million barrels per day, compared to over 20 million barrels per day for the USA and for China. On the other hand Africa's consumption accounts for over 41 percent of its energy consumption. It is therefore imperative for Africa, and Malawi for that matter, to include in its development strategies a long term planning view, for sustainable sources of oil and gas.

**Global Warming – Climate Change**

There is increasing evidence linking global warming to the burning of oil and coal and the resultant climate change (**Figure 6**).

Burning oil and coal releases carbon dioxide - CO<sub>2</sub>, greenhouse gas. There is a general consensus now that oil and coal burning are probably the largest contributor to the

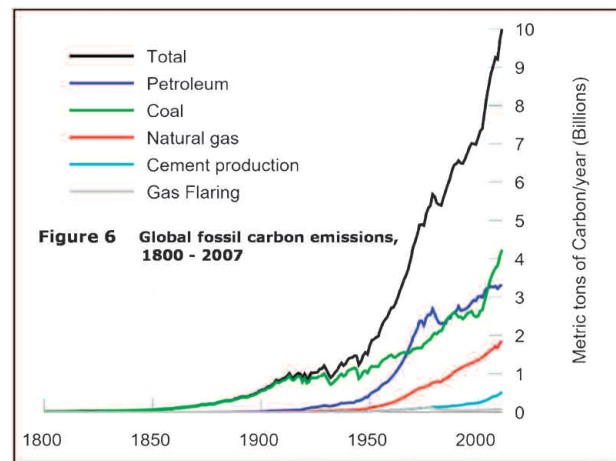


Figure 3

increase in atmospheric carbon dioxide. The USA and China, the largest consumers of oil in the world, have finally agreed at the 2015 COP21 to commence reducing emissions of CO<sub>2</sub> from their electricity generating plants and other industries.

Malawi must take a keen interest in technologies that are imported for construction of electricity power stations and cement plants, to ensure that we remain in tandem with international agreements, with regards to limitations on CO<sub>2</sub> emissions and other pollutants ■

# Malawi losing out through gemstone smuggling



A small-scale miner working on a gemstone mine hole

**By Chikomeni Manda**

Malawi is blessed with vast mineral resources which are scattered all over the country. This is evident in the minerals which are being mined currently and seems promising with the newly released geological map. Some of these mineral resources are grouped together as gemstones.

Some of these gemstones are of great value that they command large sums of money internationally. Some of the gemstones being mined in the country include ruby, sapphire, tourmaline, aquamarine, and rhodolite.

The country has seen an increase in small scale mining activities in recent years due to the discovery of new gem deposits in Salima and Dowa Districts and Kafukule in Mzimba District just to mention a few places. These places have produced high quality minerals in sizeable volumes, attracting both local and international buyers in large numbers. Despite these positive developments, only a very small percentage is declared and exported through official

channels, the rest is smuggled out hence depriving the country of necessary revenue.

Usually these gems are smuggled to the neighboring countries and exported to the world major gem markets from there. The most painful thing is that these smuggled minerals are not known as originating from Malawi but as from the exporting countries. This scenario means Malawi is not known as a gemstone mining nation because we let other countries export gems on our behalf. Therefore, there is great need for the government and other relevant stakeholders to take serious effort towards regulating the small-scale mining sector if the country is to benefit from these resources.

Gemstone smuggling often occurs at an individual level, when someone illegally moves gems across international borders due to a number of reasons as one gem dealer who stays in Karonga explains: "I applied for a dealer's Licence 8 months ago, but up to now it has not been issued. So how can I export officially without a licence? And it's expensive for me to travel to Lilongwe to process an export permit, it could have been better if we were doing it at the

district assembly. Therefore, It's easier for me to sell anyhow."

A delay in issuing licenses for small-scale miners, the high royalty rate at 10% and the lack of gemstone knowledge by customs personnel also exacerbate the problem because of their inability to recognize or spot gemstones, which creates the right recipe for smuggling. Hence, there is great need to train Customs and Immigration officials about gemstones because many minerals are smuggled through our border posts on a daily basis.

Foreigners are the ones who smuggle out gemstones after buying from illegal diggers, otherwise the majority of local miners don't have the means and capacity to take the minerals across the borders. These buyers move from one mine to another buying minerals because they have financial power compared to local dealers, hence we cannot compete with them.

James Phiri, a member of Mzimba Gemstone

Cooperative said.

Some have suggested that empowering mining cooperatives financially can help reduce the practice of smuggling because they will be able to compete effectively with the foreign buyers. Currently, there are four gemstone mining cooperatives in the country but they all face financial difficulties which mean they cannot buy minerals.

The culture surrounding gem mining and individual attempts to avoid government control create a situation which results in gem smuggling.

"Curbing gemstone smuggling is a core issue government continues tackling. Among others, the government is conducting sensitization meetings and trainings with the law enforcement authorities such as the Police, Immigration and Malawi Revenue Authority (MRA). Similarly, gemstone miners have been civic educated on gemstone exportation procedures. Further to this government is revising penalties for offenders in gemstone smuggling, hence, as Malawians we need to desist from helping foreigners smuggling minerals, that's the best remedy," one government official said.

Therefore, it is up to us as a nation to combat this malpractice. We have already lost a lot of minerals which are being depleted on a daily basis and are not coming back. It is food for thought for every patriotic Malawian, let's love our country and develop it using the resources the country has ■

## REST IN PEACE ELIYA LANGSON SAITI



*Mining & Trade Review* joins family, friends and colleagues in mourning the shocking demise of Eliya Langson Saiti.

Until his death, Saiti was working in the Ministry of Natural Resources, Energy and Mining as Regional Mining Engineer of South. He was also handling protocol issues at the ministry.

We commiserate with the bereaved family and ask for God's guidance!



# No more secrecy in mining deals

## ... companies urged to embrace EITI and disclose beneficial owners



Participants at an engagement meeting on EITI held at Capital Hotel



Company representatives at EITI orientation workshop at Riverside Hotel

By Chiku Jere

Days of secrecy over mining deals are now numbered as government in collaboration with other stakeholders is on its toes implementing several initiatives that will ensure transparency and accountability in the management of the country's natural resources for the benefit of the nation.

Among other activities, stakeholders converged at Capital Hotel in Lilongwe for a workshop on Extractives Industry Transparency Initiative (EITI), which was followed up by an orientation of Extractives Companies on EITI reporting at Riverside Hotel.

Both functions were organized by the Malawi Extractives Industry Transparency (MWEITI), a vehicle established to facilitate the EITI process in Malawi.

EITI is a global Standard which requires governments to disclose receipts on tax royalties and rental payments, licences, contracts, production, among other key elements

around resource extraction, while natural resources companies are required to disclose the payments they make to Government.

Malawi EITI organized the Capital Hotel workshop in conjunction with EITI international Secretariat based in Norway, while the Riverside Hotel event was made possible with financial support from GIZ.

In his opening remarks at the Capital Hotel function, which was attended by members of the civil society, the private sector and government officials, Director of Revenue Policy in the Ministry of Finance, Economic Planning and Development Crispin Kulemeka said government is totally committed to good governance in the management of the country's natural resources.

He explained that commitment to EITI stems from President Arthur Peter Mutharika who in June 2014 made a public declaration and subsequently made assurances to join the EITI.

Later Malawi established a Multi Stakeholder Group (MSG) with four representatives from three constituencies - the Civil Society, Government and Private Sector - and eventually an EITI Secretariat was established.

"This MWEITI, which was established with the strategic goal of ensuring national sustainable development through revenue transparency, is now working towards meeting EITI requirements to attain 'compliance' status which guarantees membership, hence the holding of the activities," he said.

He urged stakeholders to continue working tirelessly to ensure the country implements EITI effectively.

Kulemeka said government appreciates the technical work the EITI Multi-Stakeholder Group has done so far and also thanked the International EITI Secretariat for the support it renders to the cause.

"As government we are hopeful that the EITI information will stimulate informed and evidence-based dialogue on ways of how best to utilize our finite and non-renewable natural resources to meet national priorities outlined in the Malawi Growth and Development Strategy II," he said.

Kulemeka also thanked the Norwegian Embassy and the World Bank for their role in funding EITI related activities in the country.

Special recognition went to GIZ for its 'unwavering' technical and financial support towards the EITI process.

The Capital Hotel workshop comprised two major presentations, one on the new 2016 EITI Standard 'Beneficial Ownership Disclosure (BOD)' of resource companies which aims at making known to the public the natural person(s) who directly or indirectly ultimately own



Rich: Deputy Head and Regional Director for Africa and Middle East for International EITI

or control extractive entity and assets.

The presentation that was made by Eddie Rich, Deputy Head and Regional Director for Africa and the Middle East for the International EITI Secretariat was subtitled 'Revealing Who Stands Behind the Companies'.

Rich said that by revealing real owners of corporate entities, countries have managed to improve investment climate, reduce reputational and other risks, prevent corruption and illicit financial flows, improve rule of law, increase trust and accountability as well as enhance revenue collection.

Grain Malunga, Chamber of Mines Coordinator, who is also a member of MSG handled the other presentation titled 'How to Implement the Roadmap to BOD'.

Similar presentations were also made during the Riverside Hotel workshop, however, dwelling much on orienting extractives companies on EITI reporting, with much focus on the mutual benefits that companies, government and the public attain in the course of adherence to the EITI Standard.

At this event, Malunga urged companies to look at EITI not as a burden but something that brings good corporate image to the investor.

He said participation in EITI reporting provides companies with a public podium to showcase their economic contribution to a particular country.

"Communities need to know that these companies pay taxes and loyalty to government and the money is put in Account Number One and dispersed for developmental use across the country. So, by laying bare your company's revenue transactions through EITI, the public will know how much you are contributing to the government coffers through tax and loyalty remittances," he said.

All the sessions of both workshops were skewed on how Malawi could produce its first EITI Report that is comprehensible, reliable and timely and covers important revenue flows in a manner that could be understood by diverse audiences.

Malawi is expected to release its first EITI Report on April 22, 2017, whose information will be independently reconciled and verified by an Independent Administrator before final compilation.

Apart from fulfilling a requirement to attain 'compliant' status which guarantees EITI membership, the annual EITI report will also be a useful tool for all Malawians to see how the country's natural resources are being managed, and how much revenue is being generated ■

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