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## ABBREVIATIONS AND SYMBOLS

A\$	Australian dollar
B-billion	thousand million
CIF	cost, insurance, freight
e	estimate
FOB	free on board
FOR	free on rail
g/t	gram per ton
kg	kilogram
kt	thousand tons
lb	pounds avoirdupois
LME	London Metal Exchange
m	metre
Mt	million tons
Mt/a	million tons per annum
na	not available
ozt	troy ounce
t	metric ton
t/a	tons per annum
t/m	tons per month
μ	micro-
\$	US dollar, unless stated otherwise
¥	yen
€	Euro
PGM	Platinum Group Metals
SARB	South African Reserve Bank
ETL	Exchange Traded Fund
SACCI	South African Chamber of Commerce and Industry
PICC	Presidential Infrastructure Co-ordination Committee
KPCS	Kimberley Process Certification Scheme

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## 1. THE PERFORMANCE OF SOUTH AFRICA'S PRECIOUS METALS AND MINERALS SECTOR DURING THE THIRD QUARTER OF 2016.

South Africa's (SA) precious metals production declined by 3.2 percent and by 0.7 percent in the third quarter of 2016 (Q3 2016) compared with the second quarter of 2016 (Q2 2016) and the third quarter of 2015 (Q3 2015), respectively (Table 1), due to a 4 percent decrease in PGMs output, following the resumption of normal production of PGMs after the processing of backlogged concentrate in Q2 2016. Total sales mass and revenue decreased quarter on quarter (q-o-q) by 6.9 percent and 7.9 percent, respectively, in line with reduced demand and output. Despite a drop in quantity of 4.7 percent y-o-y, total sales revenue still improved by 13.8 percent as a result of higher prices, aided by a weaker rand against the dollar. The effects of y-o-y price increases are also apparent in export sales, where a drop in quantity still yielded improved revenue. Local sales were not affected by a drop in production, with quantity and the associated revenue increasing on both q-o-q and y-o-y basis. The y-o-y change in particular, is mainly attributed to a significant increase in gold uptake after a boost in fabrication demand.

Diamond production increased by 20.3 percent q-o-q and by 4.8 percent y-o-y (Table 2) in response to prevailing trade conditions, as well as increased contribution from undiluted ROM ores and improvements in grades, largely from Petra operations. Total diamond sales quantity fell by 17.9 percent q-o-q, with the corresponding revenue declining by 22.5 percent, consistent with a decrease in both local and export sales. The opposite is true for y-o-y comparisons, with an increase observed across all sale categories, indicating an improved midstream trading environment. It must be borne in mind that, apart from prevailing trade conditions, diamond sales are also affected by the schedules of tenders (Petra) and sights (De Beers), the number and magnitude of which usually differ from quarter to quarter.

TABLE 1: SOUTH AFRICA'S QUARTERLY PRODUCTION AND SALES OF PRECIOUS METALS.

	Production (t)	Local sales		Export sales		Total sales	
		Mass (t)	value (R' mil)	Mass (t)	value (R' mil)	Mass (t)	value (R' mil)
Q3 2016	107.8	15.6	7 351.6	88.4	37 372.9	104.0	44 724.5
Q2 2016	111.3	13.5	6 493.2	98.2	42 045.0	111.7	48 538.1
Q3 2015	108.6	12.9	4 850.8	96.1	34 437.5	109.1	39 288.3
<b>% Change(QQ)</b>	-3.2	15.7	13.2	-10.0	-11.1	-6.9	-7.9
<b>% Change(YY)</b>	-0.7	20.8	51.6	-8.1	8.5	-4.7	13.8

Source: Mineral Economics, DMR

TABLE 2: SOUTH AFRICA'S QUARTERLY PRODUCTION AND SALES OF DIAMONDS.

	Production (ct)	Local sales		Export sales		Total sales	
		Mass (ct)	value (R' mil)	Mass (ct)	value (R' mil)	Mass (ct)	value (R' mil)
Q3 2016	2 078 592.0	196 828.0	1 585.8	1 948 131.0	2 669.9	2 144 959.0	4 255.7
Q2 2016	1 727 177.0	357 008.0	1 882.1	2 256 305.0	3 609.9	2 613 313.0	5 492.0
Q3 2015	1 982 851.0	105 858.0	1 272.7	1 208 604.0	1 514.7	1 314 462.0	2 787.4
% Change(QQ)	20.3	-44.9	-15.7	-13.7	-26.0	-17.9	-22.5
% Change(YY)	4.8	85.9	24.6	61.2	76.3	63.2	52.7

Source: Mineral Economics, DMR

Average prices of most precious metals improved during Q2 2016, with the gold price increasing by 6.0 percent q-o-q and by 18.7 percent y-o-y (Table 3), due to the joint impact of international instability and uncertainty with respect to international markets. The platinum and palladium prices increased by 7.5 percent and 16.3 percent q-o-q, respectively, driven by a rebound in speculative and investor demand, reinforced by healthy autocatalyst demand, with palladium outperforming platinum because of slowed risk aversion. Both metals' prices improved by less than 10 percent y-o-y. Rhodium price continued to slide further down as a result of diminishing interest from the automotive sector. Polished diamond prices decreased marginally q-o-q as demand remained relatively stagnant, but decreased by 5.7 percent y-o-y.

TABLE 3: AVERAGE PRICES (\$/oz).

Period	Gold	Platinum	Palladium	Rhodium	PPI*	R/\$
Q3 2016	1 334.9	1 092.6	680.0	653.9	124.06	14.0730
Q2 2016	1 258.8	1 016.7	584.9	694.1	124.9	14.9228
Q3 2015	1125.0	996.3	619.7	826.8	131.6	12.9884
<b>%change (q/q)</b>	6.0	7.5	16.3	-5.8	-0.7	-5.7
<b>% change (y/y)</b>	18.7	9.7	9.7	-20.9	-5.7	8.4

\*PPI: Polished Diamond Price Index. This is a percentage number that shows the extent to which a price has changed over a period as compared with the price in a certain year, in this case April 2004-March 2005, taken as a standard year.

Precious metals' production is expected to fall during Q4 2016 as a result of the holiday season. Sales quantity, and therefore prices, is expected to increase on the back of continued increasing demand. Similarly, rough diamond production is expected to decrease in Q4 2016, while a stronger polished diamond demand normally associated with the holiday season is expected to put an upward pressure on the PPI. Rough diamond sales are also expected to soar in response to increased demand from cutting and polishing sectors.

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**DO Moumakwa and P Perold**

## **2. A RECENT GOLD DISCOVERY CAN BREATH NEW LIFE INTO THE FREE STATE GOLD FIELD**

*How can old mine infrastructure boost future production in the Basal Reef?*

To date, the Free State gold field has produced gold in excess of 7 500 tons (t), since its inception in 1945, by predominantly mining the Basal Reef. During this time-frame, production was widely distributed among roughly 20 smaller operations. However, since mining on the Basal Reef became deeper to access the remaining ore, mining became more expensive. As a result, those smaller mines were amalgamated into larger production units, resulting in a very advanced underground set of underground infrastructure in the Free State gold field, which by their very virtue prompted new exploration initiatives in and around the Free State Greenfields. Although exploration in the area continued to a small extent, it declined by 53 percent to \$4.6-billion in 2014/15, compared with an all-time high of \$9.7-billion in 2012. This was as a result of falling commodity prices, mined out reserves and cost-cutting measures by major gold companies.

The exploration-discovery of a 365 t gold reserve in September 2016 is expected to lead to the sinking of a gold mine in the Witwatersrand Basin for the first time in 25 years. The reserve is adjacent to an existing and decommissioned deep-level shaft over a mineral resource-rich area spanning some 9.56 square kilometer (km<sup>2</sup>). Apart from the projects optimal location, structure and accessibility the area contains additional resources of uranium (U<sub>3</sub>O<sub>8</sub>), platinum and coal that can further boost additional production and employment. Despite one of the sub-shafts in the area being placed on care and maintenance in 2009, the existing old infrastructure will facilitate the sinking of a new sub-shaft in the area adjacent to the only remaining working mine in the Free State Gold Field.

The old gold mine (decommissioned) reaches depths of between 2 200 metres (m) and 2 500 m below surface with tunnels, declines ore shoots and good access entry points.

The new mine will extend between 2 300 m-2 500 m and once in full-production, will have access to the declines and sub-tunnels required for optimal production capacity. Historically, the Basal Reef has been accessed by declines sunk from the existing underground infrastructure at Loraine, where production ended in mid-1999. Therefore, the use of the old shaft to gain access for early production is the key in delivering a strong economic evaluation. For example, early revenue estimations of the old shaft significantly reduce the maximum negative cash flow, resulting in a pay back of less than 4 years. In addition, the remaining shaft, once mined out may also facilitate additional future infrastructure.

The announcement came at a time where global gold exploration expenditure is cyclical and largely tracks the gold price. Preliminary exploration and resultant scoping studies in the Greenfield area, in and around the defunct mine on the Basal Reef indicates proven gold reserves, in excess of 40.2 million tons (Mt) at a head grade of 8.89 gram per ton (g/t). As a result, roughly 358 tons (t) of gold can be mined over a period of 30 years (Table 4).

TABLE 4: PROVEN EXPLORATION RESERVES IN THE FREE STATE GOLD FIELD

Operation	Proved Reserves	Grade	Gold	Depth
	(Mt)	(g/t)	(t)	m
Existing Mine Free State	3.0	0.13	13.0	2300-2600
New Project Scoping Study.	40.2	8.89	358.0	

Source: DMR Statistics: White Rivers/Harmony Gold Joint Venture

Due to the decline of new discoveries, particularly in the Greenfield area surrounding the Witwatersrand Basin, the exploration initiative has once again proved that that the Witwatersrand Basin is not on life support. The new gold reserve in the Free State is expected to boost production, create employment and optimise the creation of even bigger production units. Amidst falling commodity prices and the resultant challenges of mining difficult reefs, such as the Basal Reef, the new gold reserve proves that exploration may breadth new life into the Witwatersrand Basin. In addition, the possibility of additional minerals such as coal, PGMs and U<sub>3</sub>O<sub>8</sub> may create additional mining projects and ultimately ensure that the Witwatersrand Basin remains alive and well for many years to come, but perhaps more importantly ensure the creation of jobs in South Africa's challenging commodity-based economy.

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**P Perold**

### **3. SOUTH AFRICA'S FERROUS SECTOR PERFORMANCE: Q3 2016**

Aggregated ferrous minerals production increased by 11.23 percent to 25 355 kilo tons (kt) in the third quarter of 2016 (Q3 2016) compared with the second quarter of 2016 (Table 5). Iron ore and chrome ore production which increased by 20.3 percent and 5.3 percent respectively, boosted the ferrous production Q3 2016. In contrast, manganese ore production decreased by 24.8 percent in the same period, due to Samancor stopping production in June as result of a fatality, while other producers such as Mamatwan and Wessels mines underwent suspensions and restructuring, in response to the challenging market conditions.

Aggregated ferrous total sales mass declined by 6.6 percent, due to a decline in the local sales mass and export mass. Ferrous local sales mass and revenue declined by 8.8 percent and 13.4 percent, respectively due to low intake from the ferroalloy sector, as evidenced by a 8.8 percent drop in the ferroalloy production quarter on quarter (q-o-q) (Table 6). Manganese was the least absorbed commodity in the local ferroalloys industry in Q3 2016, as reflected in the 37 percent decline in local sales mass. Exports sales mass also declined by 5.6 percent, due to reduce demand particularly China. Despite an improvement in ferrous ore prices and a weaker rand in Q3 2016, total sales revenue declined by 14.2 percent due to a decline in the quantity of ore exported and sold locally in the same period. Manganese ore was the hardest hit with a drop of 38 percent in export mass in Q3 2016.

On a year-on-year basis (y-o-y), the ferrous minerals saw a slight decline in production from 25 425 kt in Q3 2015 to 25 355 kt in Q3 2016, a 0.3 percent decline y-o-y. Local sales mass declined by 13.5 percent in Q3 2016, in line with a 6.4 percent drop in ferroalloy production, as most alloys producers were shutting down and curbing production, in response to low prices, high input costs and a sluggish demand from the steel sector. Export mass

decreased by 7.5 percent y-o-y, with corresponding revenue increasing by 4.1 percent, due to a recovery of iron ore prices.

TABLE 5: SOUTH AFRICA'S AGGREGATED QUATERLY PRODUCTION AND SALES OF FERROUS MINERALS

Period	Production kt	Local sales		Export Sales		Total Sales	
		Mass (kt)	Revenue (R'mil)	Mass (kt)	Revenue (R'mil)	Mass (kt)	Revenue (R'mil)
Q3 2015	25 425	4 397	3 436	18 756	13 489	23 153	16 925
Q2 2016	22 796	4 169	3 456	18 378	16 387	22 547	19 843
Q3 2016	25 355	3 801	2 994	17 356	14 039	21 158	17 033
QQ % Change	11.3	-8.8	-13.4	-5.6	-14.3	-6.16	-14.2
YY % Change	-0.3	-13.5	-12.9	-7.5	4.1	-8.62	0.64

Source: DMR Mineral Economics

TABLE 6: SOUTH AFRICA'S AGGREGATED QUATERLY PRODUCTION AND SALES OF FERROALLOYS

Period	Production kt	Local sales		Export Sales		Total Sales	
		Mass (kt)	Revenue (R'mil)	Mass (kt)	Revenue (R'mil)	Mass (kt)	Revenue (R'mil)
Q3 2015	948	154	1 538	857	9 000	1 012	10 538
Q2 2016	990	155	1 444	1,080	10 217	1 235	11 662
Q3 2016	887	133	1 439	916	9 025	1 050	10 465
QQ % Change	-10.40	-14.19	-0.4	-15.2	-11.7	-14.9	-10.3
YY % Change	-6.43	-13.64	-6.4	6.9	0.3	3.8	-0.7

Source: DMR Mineral Economics

The steel industry continues to experience weak growth, with global steel demand expected to grow at a slight rate of 0.5 percent, to reach 1 510 million tons in 2017. While steel demand from emerging countries, excluding China, is expected to grow by 4 percent, steel demand in China is expected to decline by 2 percent in the same period. EU's referendum on Brexit resulted in a hold back on steel demand, while the stronger US dollar continues to affect steel demand, affecting manufacturing sector. The continuous decline in steel demand is expected to negatively impact South Africa's ferrous sector's production. However, the construction of chrome recovery plant, as part of Platinum producer Lonmin's bulk tailings project, is expected to boost UG2 chrome ore production, once completed in 2018. Despite an improvement in prices in Q3 2016, it is expected that they will return to mid-2015 levels, as new stock enters the market, leading to a possible oversupply.

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**RC Ravhugoni**

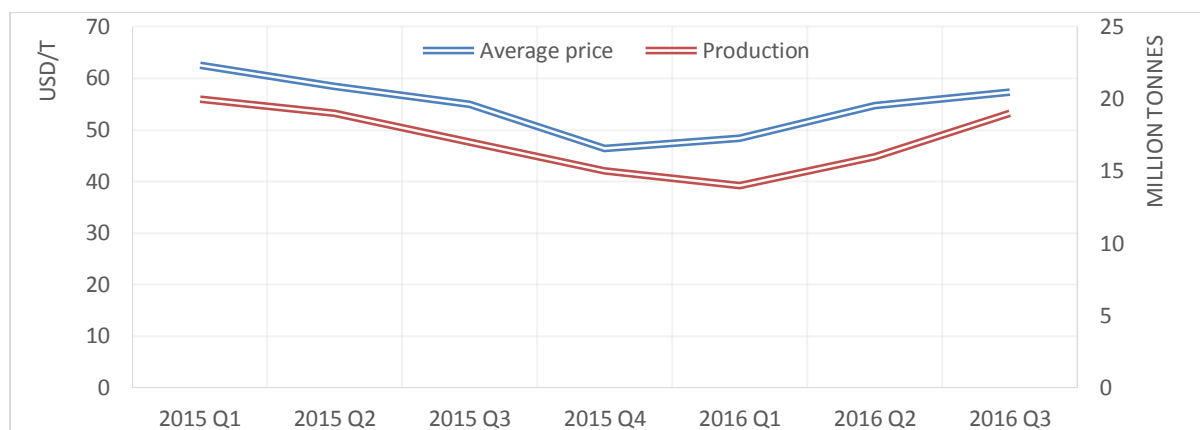
#### **4. THE SUSTAINABILITY OF THE RECENT MINING UPSWING**

A commodity upswing is often driven by industrialization and it forms part of a commodity super cycle, during which a series of increases and decreases in commodity prices can be observed over extended periods. Prior to the 1970s, commodity upswings or “commodity boom” were caused by industrial developments in the Western countries. It wasn’t until the 1970s and well into the second millennium that the industrialization and technological advancement of Asian countries started to affect a commodity upswing, with rapid price hikes. Despite slow economic slow growth in China, which is the main importer and consumer of ferrous minerals in particular, ferrous mineral prices indicated an improvement in the first, second and third quarters of 2016, following a drop in prices in 2015. Although industry experts and economists are torn on its origins, the recent mining upswing is thought to have been caused by economic developments in the USA, in particular the interest rate as well as the performance of US dollar.

The spot price of iron ore averaged \$54.7/ton (t) in the second quarter of 2016 (Q2 2016), a 13.1 percent increase as compared with the first quarter of 2016 (Q1 2016), and increased by a further 4.9 percent in the third quarter (Q3 2016) (Figure 1). The price of manganese ore averaged \$2.3/ per dry metric ton unit (dmtu) in Q1 2016, and increased to an average of \$3.6/dmtu and \$3.8/dmtu in Q2 and Q3 2016, respectively. The price of chrome followed a similar trend, with UG2 chrome increasing by 49 percent, quarter on quarter (q-o-q) to \$128.62/t in Q2 2016 and by a further 28 percent in Q3 2016. The South African 44 percent grade on the other hand, increased by 42 percent in Q3, from \$148/t in Q2, while the Turkish grade rose to \$200/t, a 5 percent increase compared with Q2.



FIGURE 1: SPOT PRICE AND SOUTH AFRICA'S PRODUCTION OF IRON ORE, 2016



Source: CRU, DMR Mineral Economics directorate

Since most commodities are priced in US dollar terms, a depreciation of this currency generally means that commodity prices are likely to rise, while an appreciation could mean that commodity prices are likely to decline. Since 2014, the US dollar index, which measures the performance of the dollar against a basket of other major currencies, has risen by over 20 percent. Also to consider, are the fluctuating interest rates in that country. However, the likelihood of rates being kept unchanged for the remainder of 2016 could cause the currency to be traded at higher frequencies, which could lead to a slight decline in the US dollar index.

In South Africa, the supply contraction of manganese ore certainly boosted price between the first and second quarters of 2016, and the expected maintenance at the Port of Port Elizabeth (where the bulk of manganese ore is exported) will further deprive the export market of supply and give extra impetus to the price. However, as the Port of Ngqura is expected to be fully operational by 2019, an estimated 12 mtpa of manganese ore will hit the export market, which is expected to put a downward pressure on the price. According to CRU, the slight recovery in Chinese demand (which was credit-driven) for iron ore, coupled with a production downgrade by the majors, was primarily responsible for the notable increase in the iron ore price. It therefore expects the oversupply in the iron ore market to moderate during the remainder of 2016 as well as in 2017.

South Africa's aggregated ferrous production increased by 23.7 percent from 20.4 Mt in Q1 2016 to 25.3 Mt in Q3 2016, as producers were responding to the upswing in prices. Although total sales mass declined by a marginal 1.5 percent, revenue showed a 16.8 percent increase during the same period, due to a weaker rand to the dollar exchange rate. Developments in the economies of the USA and China will continue to predict the performance of commodities globally. However, this latest upswing in the mining industry will

be short-lived, as prices are expected to return to mid-2015 levels, as new stock enters the market, leading to a possible oversupply.

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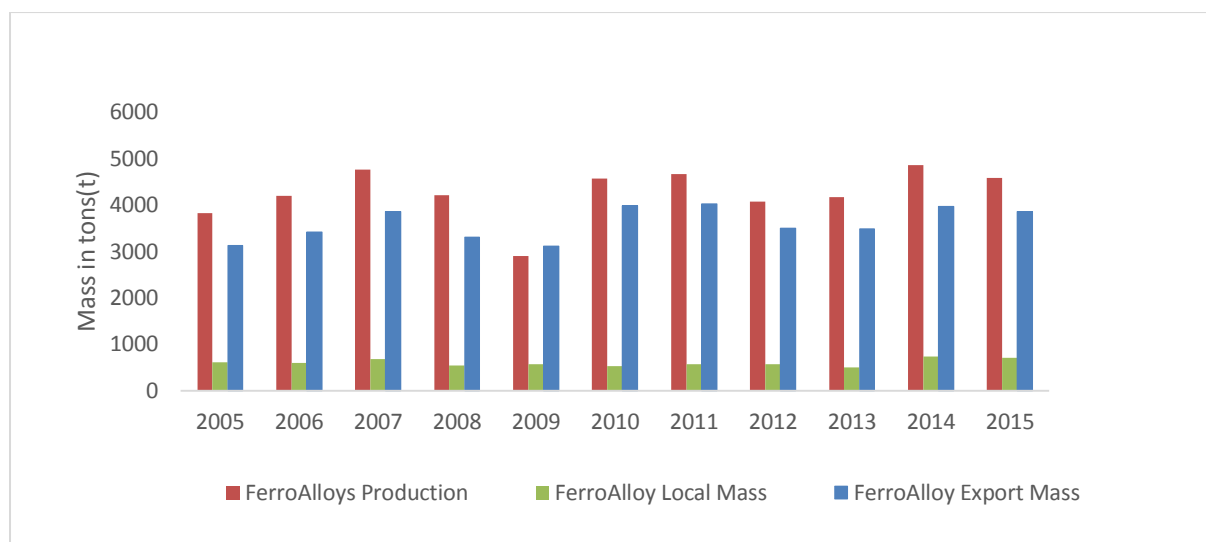
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**M Khaile**

## **5. CONSTRAINTS IN THE FERRO ALLOYS SECTOR IN SOUTH AFRICA**

South Africa plays a big role as a supplier of ferrous minerals, ranking amongst the leading producers of chrome, manganese and iron ore. The country is a significant producer of ferroalloys wherein approximately 75 percent and 38 percent of chrome and manganese ore are sold locally for ferrochrome and manganese alloys production, respectively. Due to its energy intensive nature, the alloy sector grew at an annual growth rate of only 0.02 percent over a ten year period, due partly to unavailability of electricity to ensure substantial growth, considering availability of raw inputs necessary for alloy production in South Africa (Figure 2). As such, majority of ferrous minerals and their alloys are exported to China for crude steel and stainless production, which has led to South Africa being a minority player in steel production to compete at global market level, despite availability of raw input materials, for stainless and crude steel production in the country. Due to its energy intensive nature, the ferroalloy sector is under immense pressure, due to the cost and availability of electricity, low prices and reduced demand, particularly from China. The sector has seen closure of some smelters in response to reduced demand from China due to the economic slowdown and low prices.

FIGURE 2: SOUTH AFRICA'S FERRO ALLOY AND STEEL PRODUCTION: 2005-2015



Source: DMR Mineral Economics Statistics: 2005-2015

On a year on year (y-o-y), ferroalloy production declined by 5.7 percent from 4 863 kilotons (kt) in 2014 to 4 586 kt in 2015, due to operational difficulties, global market dynamics and infrastructural challenges for example, energy supply, amongst others. South Africa's ferroalloy production declined further in 2016, opening the year at 1,056 kilotons in the first quarter of 2016, a 1.1 percent decline from the fourth quarter of 2015. Ferroalloy production declined further by 6.25 percent in the second quarter of 2016 and by 10.4 percent in the third quarter of 2016. Reduced demand from China and low prices are expected to put pressure on the ferrous and ferroalloy sectors, for the remainder of 2016. South Africa has prioritized beneficiation and manufacturing as key drivers to the country's economic growth. As such, Government has given these key drivers priority by developing policies and strategies for implementation. The policies include amongst others, Minerals Beneficiation, New Growth Path, National Development Plan and Integrated Energy Resource Plan, in a view to encouraging beneficiation and also addressing the constraints, particularly in the ferroalloy sector.

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**RC Ravhugoni**

## 6. SOUTH AFRICA'S PRODUCTION AND SALES OF NONFERROUS METALS AND MINERALS DURING THE THIRD QUARTER OF 2016

Preliminary data released by Mineral Economics Directorate indicate that South Africa's production of nonferrous metals and minerals, excluding aluminium and mineral sands, increased by 5.2 percent to 46.8 kt from 44.5 kt in the third quarter of 2016 (Table 7). This was due to the re-opening of the refinery which was closed for maintenance between May and June 2016 at Palabora Mining Company. On a y-o-y basis, production declined by 7.1 percent, owing to sluggish output from most producers due to lower ore grades and plant maintenance.

TABLE 7: SOUTH AFRICA'S PRODUCTION AND SALES OF NONFERROUS METALS AND MINERALS IN THE THIRD QUARTER OF 2016

PERIOD	PRODUCTION	LOCAL SALES			EXPORT SALES			TOTAL SALES	
		MASS (t)	VALUE (R'mil)	UNIT VALUE	MASS (t)	VALUE (R'mil)	UNIT VALUE	MASS(t)	VALUE (R'mil)
Q2:2016	44 520	8 105	1 004	523 775	26 772	3 381	585 006	34 877	4 385
Q3:2016	46 845	9 477	1 105	520 216	32 693	3 409	547 956	42 170	4 514
Q3:2015	50 419	9 809	1 249	535 714	34 850	4 052	603 474	44 659	5 301
Q/Q	5.22	16.93	10.06	-0.68	22.12	0.83	-6.33	20.91	2.94
Y/Y	-7.09	-3.38	-11.53	-2.89	-6.19	-15.87	-9.20	-5.57	-14.85

Source: Mineral Economics, DMR

Local sales volume and revenue rose by 16.9 and 10.1 percent to 9.5 kt and R1 105 million, respectively on q-o-q basis, the 25 percent drop in cobalt volume sales was offset by improved copper (23 percent) and nickel (2 percent) sales volumes. Export sales volume and revenue also increased by 22.1 and 0.8 percent to 32.7 kt and R3 409 million, respectively in the same period, due to higher demand from major consuming countries. The local and export unit sales decreased by 0.68 and 6.3 percent, respectively in the third quarter of 2016, compared with the previous quarter. Both local and export sales revenue declined by 11.5 and 15.9 percent y-o-y, in that order. During the same period, local sale and exports sale volumes fell by 3.4 percent and 6.2 percent, respectively. Additionally, local and export unit sales fell by 2.9 and 9.2 percent in Q3 of 2016 compared with the same period in 2015. This can be attributed to low demand and lower prices.

Aluminium cash settlement price increased by 3.0 percent to US\$1 621 in Q3 2016 compared with Q2 in 2016, the increase in price was due to improved supply cuts mainly from China. London Metal Exchange (LME) copper settlement price increased by 1.0 percent to an average of \$4 773.72 /t in the Q3 of 2016, compared to the previous quarter

(Table: 8). The slight price increase is attributed to the falling US dollar against major currencies and stimulated demand for the metal. LME lead cash settlement price rose by 9.0 percent to an average of \$1 872 /t in Q3, due to higher demand for automobile in China and the US as well as surging industrial use of the lead acid battery. The cobalt price surged by 11 percent in Q3 of 2016, compared with the previous quarter, due to supply restrictions from the DRC until artisanal mining is better regulated. Nickel and zinc prices rose by 16 and 18 percent to \$10 254/t and of \$2 254/t, in Q3 2016 respectively. This is due to falling inventories in the warehouses as investors are anticipating a supply deficit.

TABLE 8: AVERAGE COMMODITY PRICES FOR THE THIRD QUARTER OF 2016

COMMODITY (\$/t)	Q3:2015	Q2:2016	Q3:2016	% CHANGE
Aluminium	1 589	1 571	1 621	3%
Cobalt (\$/lb)	14	11	12	11%
Copper	5 251	4 730	4 774	1%
Lead	1 712	1 719	1 872	9%
Nickel	10 538	8 819	10 254	16%
Zinc	1 844	1 914	2 254	18%

Source: Metal Bulletin

South Africa's supply of nonferrous minerals and metals is expected to increase in the next quarter going into 2017. Business Monitor International (BMI), forecasts that nickel will grow by 17 percent, copper (2 percent), lead (3 percent) and zinc (6 percent). Demand for these minerals is also anticipated to rise as major consuming countries particularly China requires more, in-line with its moderately growing economy. Local demand is also anticipated to increase as the South African government plans to spend R900 billion in infrastructure development in the next 3 years, particularly in energy, transport and telecommunication sectors. The upsurge in demand will lead to metal prices continuing to improve, after falling for a long time.

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**L Ramane**

## **7. RENEWABLE ENERGY SPARKS THE NEW WAVE FOR COPPER DEMAND**

### ***New energy technologies require more of the red metal than traditional sources***

Climate change concerns, together with rapid population growth and increasing standard of living are driving societies to switch to alternative energy sources which are more environmentally friendly, such as renewable energy in a bid to reduce carbon emission. The increased penetration of renewable energy in the energy mix, particularly in developing and emerging countries as more people gain access to electricity is evident in the outcomes of the Renewable Energy Policy Network for the 21<sup>st</sup> Century (REN21) report, which noted the decrease of carbon emission while energy demand grew in line with economic growth. The growing global transition from fossil fuel based power generation to clean renewable energy has a potential to double the current copper demand in the energy sector by 2030. While traditional power requires approximately 1 ton of copper per megawatt (MW) installed, renewable energy technologies such as wind and solar PV requires three to four times more copper per installed MW. In a bid to re-optimize the country's energy mix and to implement international commitments to constrain CO<sub>2</sub> emissions, South Africa has, through the Integrated Resource Plan 2010 (IRP 2010), which is currently being updated, committed to increase renewable energy generation to 13 225MW by 2025 through Independent Power Producer (IPP) Procurement Programme, solar photovoltaic (PV) and wind power. Currently, there are 42 renewable energy projects that have been installed across the country that produce more than 2000 MW of electricity, jointly.

According to Bloomberg New Energy Finance, \$8 trillion has been invested on renewable energy which is expected to double the share of global electricity generated from renewable energy sources to 46 percent by 2030. Renewable energy, led by wind, solar PV and hydro power, which is considered to be copper intensive is expected to be major catalysts for the new wave of copper demand. New energy technology and to a lesser extent other technologies such as one used in electric cars supported by the demographic growth forecast, are anticipated to add an additional 30.8 Mt of copper demand to the market by 2030, according to the industry group, International Copper Association (ICA).

The copper market has been oversupplied since 2011 by an average of 108 kt per year and the current market excess is expected to diminish by 2018. The anticipated supply deficit as well as rising demand for copper could incite investment into new projects around the world. In South Africa, several exploration projects are currently underway in the Northern Cape where Galileo Resources is investigating more than 34 prospective copper targets within their Concordia project. Orion Gold has embarked on a zinc/copper exploration project at

Prieska Copper mine in the Northern Cape. Initial examinations of the drilling programme include grades of up to 21.7 percent zinc and 7.5 percent copper.

The current projects will put the country in a good position to take advantage of the expected surge in copper demand in the medium to long term. These are likely to create direct job opportunities in the copper industry, as producers will be looking to maximise output to meet forecasted rising demand as well as indirect jobs in the renewable energy industry as South Africa diversifies its energy mix to include renewable energy sources.

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**S Mnyameni**

## **8. SOUTH AFRICAN ZIRCON PRODUCTION AND SALES DURING THE THIRD QUARTER (Q3) 2016.**

Demand for zircon is primarily driven by the production of ceramics (tiles), its largest consuming end use market accounting for 57 percent of global consumption, followed by foundry, chemicals and refractory industries. Zircon is also used extensively in the nuclear energy industry and in the development of surgical tools and appliances. South African zircon is produced as a by-product of titanium mining.

The global zircon market has been oversupplied since 2012 during which the market experienced moderate growth in global demand and relatively flat prices. This was exacerbated by an influx of zircon substitutes. South African zircon production increased by 11 percent to 100 kt in the third quarter of 2016 (Q3: 2016) compared with 90.1 kt in the second quarter of 2016 (Q2: 2016) as depicted in table 9. This was due to improved recoveries following the installation of a new water system at Tormin mine. However on y–on-y basis, production declined by 0.1 percent from 101 kt in quarter of 2016 (Q3: 2015) to 100 kt in quarter three of 2016 (Q3: 2016), due to electricity challenges at Tronox (Namakwa Sands) and labour unrest in the Tormin mine.

Demand for zircon is driven by consumption from China, currently responsible for 40 percent of demand, followed by Europe and North America. China is South Africa's largest importer of zircon products.

On a q-o-q basis, local sales volumes and revenues declined by 40.7 percent and 48.8 percent to 0.7 kt and R8.61 Million in quarter of 2016 (Q3: 2016), respectively. This was attributed to a weaker local demand and a decline in unit price as depicted in table 9. On y-o-y, local sales volumes and revenues dropped by 0.7 percent and 66.4 percent, respectively, due to declining demand and lower unit prices.

TABLE 9: SOUTH AFRICA'S QUARTERLY PRODUCTION AND SALES OF ZIRCON

Period	Production Quantity (kt)	Local Sales			Export Sales			Total Sales	
		Quantity (kt)	Value (R'000)	Unit Price	Quantity (kt)	Value (R'000)	Unit Price	Quantity (kt)	Value (R'000)
Q3 2015	101	2	25.6	39,164	115	1.38	36,541	116	1,41
Q2 2016	90.1	1.2	16.8	42,050	99.3	1.18	35,453	100.5	1,20
Q3 2016	100	0.7	8.61	39,247	98.5	1.1	33,371	99.2	1,10
% Change Q/Q	<b>10.99</b>	<b>-40.7</b>	<b>-48.8</b>	<b>-6.7</b>	<b>-0.8</b>	<b>-6.8</b>	<b>-5.9</b>	<b>-1.3</b>	<b>-8.3</b>
% Change Y/Y	<b>-0.1</b>	<b>-0.7</b>	<b>-66.4</b>	<b>0.2</b>	<b>-14.2</b>	<b>-20.3</b>	<b>-8.7</b>	<b>-14.5</b>	<b>-22</b>

Source: DMR, Mineral Economics.

Export sales volumes and revenues declined by 0.8 percent and 6.8 percent, respectively, due to weak demand from main consuming regions and a 5.9 percent decline in unit prices to 33,371/t. Similarly, on year on year basis export sales volumes and revenues declined by 14.2 and 20.3 percent, respectively, attributed to weaker demand spurred by high supply of zircon substitutes and a 8.7 percent decline in unit prices to R33,371 in Q3:2016 compared with R36,541/t in Q3:2015.

The weakening of zircon demand due to market excess and the introduction of substitutes have continued to exert a downward pressure on zircon prices. This resulted in a 20.5 percent decline in zircon average prices to \$975/t in Q3: 2016 compared with \$1226.6/t in Q2:2016 as depicted in table 10. Y-o-y, the commodity prices declined by 11.4 percent.



TABLE 10: AVERAGE PRICES (A\$/t)

Commodity	Q3:2015	Q2:2016	Q3:2016	% change (Q/Q)	% Change (Y/Y)
Zircon	1100	1226.6	975	-20.5	-11.4

Source: Mineral/Metal Prices, 2015-2016

The global zircon market surplus is anticipated to continue in the 4<sup>th</sup> quarter of 2016 and will continue to depress zircon prices, owing to new projects anticipated to come on stream.

There are a number of developments underway in South Africa, including the granting of a new mining right to Tormine mine on a 10,500 hectares of land by the Department of Mineral Resources, with the main objective being of increasing zircon production and extending the lifespan of the mine. Additionally, Rio Tinto is currently working on the feasibility study which is based on the extension and replacement of Zulti North mine which is nearing the end of its lifespan. The new Zulti South mine is expected to produce 90 kt of zircon per annum in addition to the current capacity of 250 kt and production is expected to commence in 2017. However, additional supply is expected to come from Fairbreeze mine, following the official opening of the mine in April 2016. This mine is expected to produce approximately 55kt per annum at full capacity. The additional capacity is likely to have an impact on zircon prices local and globally as the new supply is like to add on to the already oversupplied market.

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**Y Munyu**

## 9. SOUTH AFRICA'S PRODUCTION AND SALES OF ENERGY COMMODITIES DURING THE THIRD QUARTER OF 2016

According to preliminary statistical data released by the Mineral Economics Directorate, production of energy commodities marginally increased by 0.69 percent to 65.1 Mt in the third quarter of 2016 compared with quarter 2 of the same year (quarter-on-quarter (q-o-q)) (Table 11). Year-on-year (y-o-y), a 0.26 percent growth in energy commodities production. Similarly, local sales volume of energy commodities improved by 3.76 percent q-o-q and 2.23 percent y-o-y to 47.85 Mt. these higher local sales boosted the revenues collected from energy commodities sales, which increased by 5.27 percent q-o-q and 4.72 percent y-o-y R16.3 billion.

During the same time, export of energy commodities plunged by 11.3 percent q-o-q and 10 percent y-o-y to 16.63 Mt. revenues generated from export sales increased by 2.99 percent to R11.94 billion q-o-q mainly boosted by the higher coal export price in the third quarter of 2016. However, y-o-y, this was an 11.25 percent drop in export sales revenues.

TABLE 11: SOUTH AFRICA'S PRODUCTION AND SALES OF ENERGY COMMODITIES IN THE THIRD QUARTER OF 2016.

Commodity	Period	Production	Local Sales			Export Sales			Total Sales	
		Quantity (Mt)	Quantity (Mt)	Value Billion (R)	Unit Value (R/t)	Quantity (Mt)	Value Billion (R)	Unit Value (R/t)	Quantity (Mt)	Value Billion (R)
Coal	Q3 2016	64,78	47,70	15,97	334,67	16,57	11,90	717,00	64,26	27,87
	Q2 2016	64,33	45,96	15,11	328,67	18,66	11,52	618,00	64,62	26,63
	Q3 2015	64,03	44,84	14,19	316,67	20,71	12,94	624,67	65,55	27,12
	Q3 2016 vs Q2 2016 (%)	0,70	3,78	5,74	1,83	-11,22	3,23	16,02	-0,55	4,65
	Q3 2016 vs Q3 2015 (%)	1,18	6,38	12,57	5,68	-20,00	-8,03	14,78	-1,96	2,75
Natural Gas	Q3 2016	0,15	0,15	0,28	1853,00	-	-	-	0,15	0,28
	Q2 2016	0,15	0,15	0,30	1980,33	-	-	-	0,15	0,30
	Q3 2015	0,26	0,26	0,50	1908,67	-	-	-	0,26	0,50
	Q3 2016 vs Q2 2016 (%)	1,28	1,28	-5,06	-6,43	-	-	-	1,28	-5,06
	Q3 2016 vs Q3 2015 (%)	-41,96	-41,96	-43,57	-2,92	-	-	-	-41,96	-43,57
Natural Gas Condensate	Q3 2016	0,01	0,01	0,05	7358,00	-	-	-	0,01	0,05
	Q2 2016	0,01	0,01	0,08	7813,33	-	-	-	0,01	0,08
	Q3 2015	0,01	0,01	0,10	6652,33	-	-	-	0,01	0,10
	Q3 2016 vs Q2 2016 (%)	-41,52	-41,52	-43,65	-5,83	-	-	-	-41,52	-43,65
	Q3 2016 vs Q3 2015 (%)	-57,36	-57,36	-53,29	10,61	-	-	-	-57,36	-53,29
*Uranium (kt)	Q3 2016	0,11	-	-	-	0,06	0,05	551,00	0,06	0,05
	Q2 2016	0,11	-	-	-	0,08	0,07	291,67	0,08	0,07
	Q3 2015	0,13	-	-	-	0,12	0,13	714,67	0,12	0,13
	Q3 2016 vs Q2 2016 (%)	-1,72	-	-	-	-29,73	-34,38	88,91	-29,73	-34,38
	Q3 2016 vs Q3 2015 (%)	-16,87	-	-	-	-51,85	-63,74	-22,90	-51,85	-63,74
Totals	Q3 2016	65,05	47,85	16,30	-	16,63	11,94	-	64,48	28,25
	Q2 2016	64,61	46,12	15,49	-	18,75	11,60	-	64,87	27,08
	Q3 2015	64,43	45,11	14,79	-	20,83	13,07	-	65,95	27,86
	Q3 2016 vs Q2 2016 (%)	0,69	3,76	5,27	-	-11,30	2,99	-	-0,59	4,30
	Q3 2016 vs Q3 2015 (%)	0,26	2,23	4,72	-	-10,02	-11,25	-	-1,64	-2,78

Source: Directorate Mineral Economics

Coal production increased by 1.18 percent to 64.78 Mt in the three months ending September 2016 compared with the same period in 2015 (year-on-year), as depicted in Table 11. Compared with the second quarter of 2015 (quarter-on-quarter), this represents a 0.7 percent growth, which can be attributed to the commissioning of Universal Coal's New Clydesdale Colliery in September 2016.

Due to the oversupplied market and lower uranium prices, uranium production decreased by 1.72 percent q-o-q and 16.87 y-o-y to 0.11 Mt. Natural gas production increased marginally by 1.28 percent to 0.15 Mt q-o-q. Year-on-year, this was a 41.96 percent decline. Similarly, natural gas condensate production plunged 41.52 percent q-o-q and 57.36 percent y-o-y to 6 kt, mainly due to ceased production from PetroSA's Orca FPSO.

Coal local sales volumes increased both q-o-q and y-o-y by 3.78 percent and 6.38 percent respectively to 47.70 Mt. Correspondingly, the revenue generated from local coal sales surged 5.74 percent q-o-q and 12.57 percent y-o-y to R15.97 billion, also boosted by the unit price that increased by 1.83 percent q-o-q and 5.68 percent y-o-y to R335 /t.

Natural gas local sales volumes increased by 1.28 percent q-o-q to 0.15 Mt. Year-on-year, this represents a 41.96 percent decrease. Owing to lower sales volumes and unit value that also fell 6.43 percent q-o-q and 2.92 percent y-o-y to R1 853/t, revenues generated from local sales plunged 5.06 percent q-o-q and 43.57 percent y-o-y to R280 million.

Similar to the natural gas, natural gas condensate local sales volume decreased by 41.52 percent q-o-q and 57.36 y-o-y to 0.116 Mt in the third quarter of 2016. Local sales revenue decreased by 43.52 percent q-o-q and 53.29 percent to R460 million. The unit value decreased by 5.8 percent q-o-q to R7 358 /t. Y-o-y, the unit value increased by 10.61 percent. However, the increase was not enough to offset the impact of lower sales volume.

Uranium export volumes declined by 29.73 percent q-o-q and 51.85 percent y-o-y to 0.06 kt. Uranium export revenue, dropped accordingly by 34.38 percent q-o-q and 63.74 percent y-o-y to R50 million. The uranium export unit value surged 88.91 percent q-o-q to R551 /t, this was a y-o-y drop of 22.9 percent.

Coal exports plunged 11.22 percent q-o-q and 20 percent y-o-y to 16.57 Mt in third quarter of 2016 due to a month long shutdown in coal deliveries, whilst the coal export rail line was shut for maintenance. The price of export coal increased by 16.02 percent q-o-q and 14.78

percent y-o-y to average R717/t in the third quarter of 2016 (Table 11). Revenues generated from coal export sales grew by 3.23 percent q-o-q and fell 8.03 percent y-o-y to R11.90 billion during the third quarter of 2016.

Market conditions remain tough for coal mining companies as demand for coal is still weak and export prices are expected to remain flat in the fourth quarter of 2016. Coal production is expected to drop slightly in the fourth quarter as some mines will close for the December holidays. Local sales are also forecast to remain at current levels until Eskom commissions the next unit at the new Medupi power station. Domestic coal price is expected to edge up slightly, reaching R337 /t during the fourth quarter of 2016. Coal export volumes are expected to improve as the coal export rail line is fully functional after maintenance closure.

The South African hydrocarbon market (gas and oil) is very depressed currently, with oil production having stopped for more than 12 months to date; and gas reserves also dwindling. However, the country will have to look beyond these challenges and consider what will shape the industry going forward. According to more than 70 percent of organizations, regulatory and licensing systems are seen as the top challenges facing oil and gas businesses. The government should consider working with these organizations as supportive and strategic partners in order to resuscitate gas and oil industries. Natural gas and natural gas condensate production is forecast to fall further, due to the depleting resources at PetroSA's gas fields. However, the country is currently rolling out gas infrastructure, with Coega recently completing the preliminary work for combined-cycle gas turbine power project in the Coega Industrial Development Zone (IDZ) as well as, integrating the Liquid Natural Gas receiving infrastructure within the deep water Nqura port. All this work will lay a foundation for shale gas extraction if the country does consider following that route, the infrastructure will be ready. Following on the trend of the past three quarters of 2016, uranium production is expected to remain at current levels.

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## 10. TECHNOLOGIES TO UTILISE COAL DISCARDS

### ***South African government (through SOE's) and the private companies are committed to dealing with the challenges posed by discard coal***

South Africa's coal mines generate about 60 million tons (Mt) of discard (waste) coal annually and it is estimated that over the past 35 years, South African mines accumulated about two billion tons (Bt) of waste coal. The manner in which the coal discards are stored pose a challenge to the environment in the form of water and air pollution; and the risk of creating fires through spontaneous combustion. State Owned Enterprise (SOE), Mintek is developing a direct current (dc) arc plasma gasification concept that will produce synthesis gas (syngas) from low grade fine waste coal. According to Mintek, this technology will produce market quality syngas from what is essentially an unprofitable waste product. This technology will help mitigate environmental challenges emanating from coal discards storage, minimise waste and increase the coal end user market.

The product of the dc arc plasma gasification process is a highly combustible syngas mixture consisting of methane, carbon monoxide, hydrogen, carbon dioxide and water vapour that can be used for various applications including; heating, electricity production, petro chemistry and extractive metallurgy.

Mintek has completed the fundamental calculations and conducted the necessary research having started working on the project 18 months ago. Currently, Mintek is looking at designing and constructing a pilot-scale conceptual design of the dc arc plasma gassifier to demonstrate the proof of concept within the next two to three years. This presents an opportunity for companies that are battling with coal discards to partner with Mintek in order to address the challenges associated with coal discards.

The 306 MW Khanyisa coal-fired project is another project that would help address the challenge of coal discards. The project is owned by Saudi electricity group ACWA Power, which forms part of the Khanyisa consortium, constituted of Thebe Investments, Pele Natural Energy, Mazi Capital and the Palace Group. The black-empowerment equity participation in the project is 37 percent and the overall South African ownership stands at 51 percent. The project will incorporate circulating fluidised bed (CFB) technology. This will also reduce the environmental impact of waste coal. The Khanyisa project will utilize the discard from nearby Anglo American collieries.

The CFB technology will ensure that even with the low-heat discard coal, the sulphur dioxide and nitrogen oxide emissions will be lower than the current emissions in power stations around the country. Another significant feature of the power station to be built is that it is a dry-cooled station because the water utilized in this power station will be reclaimed from underground mine operations in the region. The Khanyisa project will create about 3 000 jobs during construction and 150 permanent jobs during commercial operation. It is estimated that the station will be in commercial operation by December 2020.

These two separate developments clearly indicate that the South African government (through SOE's) and private partners are committed to dealing with the challenges posed by discard coal. Both projects will mitigate the environmental impact caused by discard coal while at the same time creating jobs. This will also make sure that the country's coal resources are used optimally with less or no discards. These two projects will also extend the profitability of coal by utilizing low grade fine coal discard that was not utilized in the past.

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## **11. INDUSTRIAL MINERALS SECTOR PERFORMANCE – QUARTER 3, 2016**

The slowdown in China's economy coupled with high degrees of volatility surrounding emerging market currencies and capital flows continued to contribute to a lacklustre performance of the South African economy from a global perspective. Total volume of sales of industrial minerals was marginally up by 0.6 percent (q-o-q) to 26.3 Mt in the third quarter of 2016 compared with 26.1 Mt in the second quarter of 2016 (Table 12). The value of total sales increased by 3 percent recording R4.6 billion in the same period, owing to improved demand for most of industrial minerals. Local sales volumes increased slightly by 0.5 percent to 25.9 Mt resulting in a 3.7 percent increase in revenue to R3.8 billion because of gains in volume from the phosphate rock sub-sector. Sales volume of phosphate rock increased by 52 percent to 424 kt raising the level of revenue to R674 million, a 26.9 percent increase compared with the previous quarter. Export sales volume increased by 4 percent to 361.7 kt owing to strong fluorspar sales. Fluorspar export sales quantity increased immensely by 371.9 percent (q-o-q) and increased by 359.5 percent (y-o-y). The inflated export quantity was due to China's production restrictions and fluorspar exports limit.

TABLE 12: SOUTH AFRICA'S SALES OF INDUSTRIAL MINERALS QUARTER 3, 2016 COMPARED WITH QUARTER 2, 2016

QUARTERS	LOCAL SALES (FOR)		EXPORT SALES (FOB)		TOTAL SALES	
	Mass (kt)	R'000	Mass (kt)	R'000	Mass (kt)	R'000
Q2 (2016)	25 781.4	3 628 383.6	348	790 503.8	26129	4 418 887.4
Q3 (2016)	25 922.3	3 762 397.6	362	788 446.4	26284	4 550 844.0
Q3 (2015)	26 372.4	3 390 977.5	425	838 495.4	26797	4 229 472.9
<b>Change Q3/Q2 (q-o-q)</b>	<b>0.5%</b>	<b>3.7%</b>	<b>4.0%</b>	<b>-0.3%</b>	<b>0.6%</b>	<b>3.0%</b>
<b>Change Q3/Q3 (y-o-y)</b>	<b>-1.7%</b>	<b>11.0%</b>	<b>-14.8%</b>	<b>-6.0%</b>	<b>-1.9%</b>	<b>7.6%</b>

Source: DMR, Directorate Mineral Economics

### PRICES

Local sulphur prices decreased by 27 percent to R906/t (q-o-q) on the back of changing market dynamics from oil refineries/synthetic fuels markets. Vermiculite prices picked up by 4.1 percent (q-o-q) to R2 414/t owing to improved demand. Phosphate rock prices decreased by 15.8 percent (q-o-q) to R1 600/t as demand from fertiliser applications decreased, exacerbated by prevailing drought conditions. Prices for aggregate and sand decreased by 1.5 percent (q-o-q) to R108/t, while prices for limestone went up by 6.5 percent (q-o-q) to R147/t as a result of subdued construction market. Dimension stone prices decreased by 0.5 percent to R2 420/t.

TABLE 13: AVERAGE UNIT VALUE OF SELECTED COMMODITIES

Commodity	Q2 2016 (R/t)	Q3 2016 (R/t)	% change
Andalusite	1 602	1 616	0.8%
Fluorspar	2 856	2 875	0.7%
Sulphur	1 244	906	-27.1%
Vermiculite	2 318	2 414	4.1%
Phosphate Rock	1 901	1 600	-15.8%
Limestone and dolomite	138	147	6.5%
Dimension stone	2 433	2 420	-0.5%
Aggregate and sand	110	108	-1.5%

Source: DMR, Directorate Mineral Economics

## Outlook

Weakened economic fundamentals, characterised by low investor confidence and higher lending rates has resulted in general weak demand for commodities. According to Industry Insight, the overall growth outlook for private sector residential construction has deteriorated over the last 12 months, with the trend now officially sitting at -1.7 percent growth over that period. The growth rate has declined month after month in the last year, indicating a clear downturn in the demand for residential building on a national scale.

Growth in industrial minerals is expected to remain muted in the medium term on the back of the current drought conditions, which have had severe effects on agricultural output, affecting demand for input minerals such as phosphate rock and vermiculite into fertilisers. The low growth environment in the construction sector will also push down consumption of minerals like limestone in the manufacturing of cement and aggregates and sands, in spite of R987.4 billion infrastructure expenditure, announced in the Medium Term Budget Policy Statement of which year.

### Sources:

1. DMR, Directorate Mineral Economics
2. Industry Insight, Construction Monitor, July 2016.

R Motsie

## 12. BENTONITE THRIVES AMID PRESSURES ON KEY END MARKET

*Oilfield industry takes a dive but bentonite is spared*

Bentonite is produced by three mines in South Africa and is consumed in markets such as oilfields, iron ore palletisation (IOP) and cat litter. Bentonite end-uses include civil engineering, feeds, water treatment, ceramics, and agriculture. The oilfields industry is one of the booming end-markets that were greatly responsible for driving bentonite demand when it was at its low in 2012. In South Africa, for the past ten years, local consumption was driven by demand from the construction of Eskom's Medupi power station in Lephalale and currently the Kusile project in Mpumalanga, which is expected to be completed in 2018.

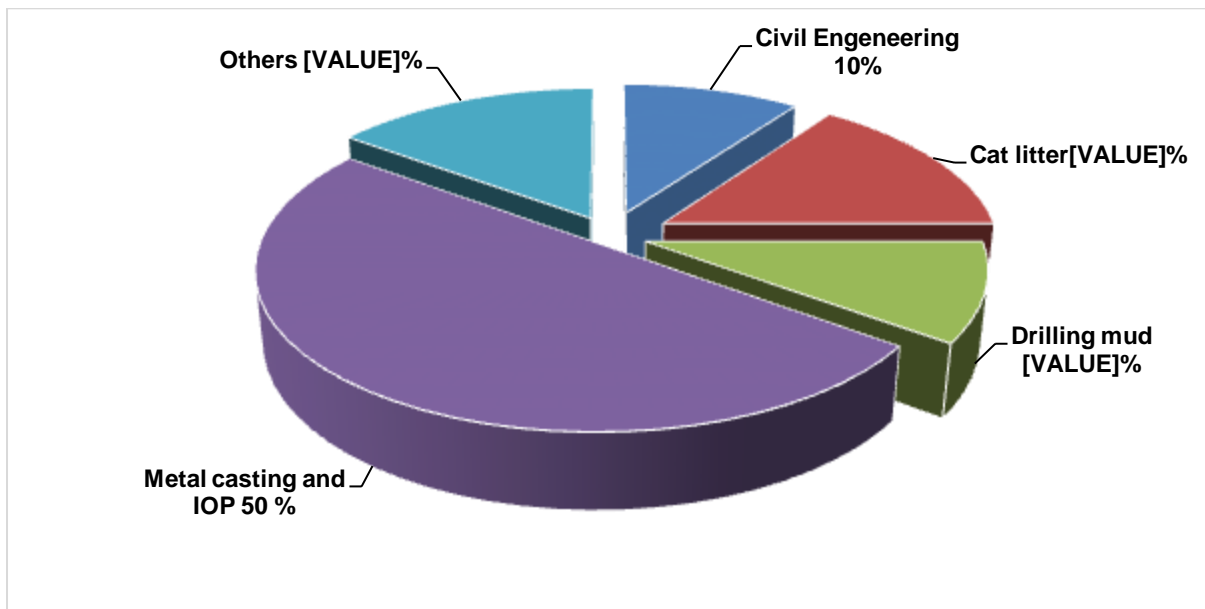
Globally in 2015 high volatility in energy prices shook commodity markets, with oil prices declining to record lows experienced in decades. This had negative consequences for oilfield service operators as well as mineral suppliers, who saw demand and prices falling for prop pants and barite. Bentonite however, was spared to some extent as it has a wide range of



market uses. The down turn in other oilfield minerals was evident as performance of these minerals is strictly linked to the performance of fossil fuel prices.

Global bentonite production was estimated at 16 Mt by the *United States Geological Survey* (USGS) in 2015. Metal casting and IOP accounted for 50 percent of global consumption; a further 15 percent went into cat litter, civil engineering consumed another 10 percent while drilling mud for accounted for 10 percent of total output (Fig. 3).

FIGURE 3: BENTONITE END-MARKET CONSUMPTION 2015



Source: *Industrial minerals 2016*

Despite the decrease in oil prices, bentonite exports still flourished rising to 4.6 Mt in 2015. Growth in exports of the mineral was driven by higher demand in oil drilling, together with increased consumption in foundry and IOP applications. In value terms the clay performed well, staying firmly over the \$600 million mark every year since 2011.

Industry operators remain cautious about the significance of the recent surge in oil prices on the long-term, and activity in the oil and gas sector is unlikely to strengthen until a sustained price increase materializes. Oil price strengthening may be on the way between now and the end of the year 2016, gathering more force into 2017. Global production will need to drop enough that users start to tap the world's voluminous inventories, which is only expected to happen towards the end of 2017. Increasing production capacities along with ever expanding bentonite demand from oil and gas industry as a drilling mud additive is expected to have a positive impact on the market growth until 2020. The Eskom Kusile project is also

expected to sustain South Africa's production until 2018 when it is completed, coupled with anticipated exploration of shale gas reserves in the Karoo.

**Sources:**

1. *Bentonite and kaolin: 2016 World Market Review and Forecast*
2. *DMR, Directorate Mineral Economics*
3. *Industrial Minerals Magazine, 2016*
4. *Mineral commodity summaries 2016*
5. [www.imerys.com](http://www.imerys.com)

**M Muravha**

**13. SOUTH AFRICA'S SULPHUR SALES IN THE THIRD QUARTER, 2016**

Sulphur is the main feedstock for producing sulphuric acid, which is one of the most used chemicals in the world. As an inorganic acid, it is used in many applications including fertilisers, chemicals, paints, rubber products, medicines, fibres, sugars, detergents, plastics and paper. In the fertiliser industry, sulphuric acid is used to process phosphates, nitrogen and sulphate fertilisers.

South Africa's production for sulphur increased by 12.3 percent (quarter on quarter). Local sales quantity increased by 21.9 percent the third quarter of 2016 compared to the second quarter of the same year (Table 14). The local sales value decreased by 10.4 percent due to a decreased unit value in the third quarter. The diminishing interest of sulphur due to low phosphate rock consumption caused a decrease in export quantity by 2.8 percent and unit value by 16.8 percent. South Africa's exports revenue decreased by 19.0 percent in the third quarter of 2016 due to a decrease in unit price, compared to the previous quarter. Extensive outpour of speculation capital and expanded exchange uneven characters have brought about sharp money devaluations and rising inflationary pressures.

TABLE 14: SOUTH AFRICA'S QUARTERLY PRODUCTION AND SALES OF SULPHUR

	Production	Local Sales			Export Sales			Total Sales	
	Mass (t)	Mass (t)	Value (R`000)	Unit Value	Mass (t)	Value (R`000)	Unit Value	Mass (t)	Value (R`000)
<b>Q3 2016</b>	79 717	36 338	32 925	2 719	43 182	62 827	4 365	79 520	95 752
<b>Q2 2016</b>	71 002	29 802	36 752	3 732	44 439	77 571	5 244	74 241	114 324
<b>Q3 2015</b>	72 260	39 642	35 195	2 652	31 139	74 390	7 146	70 781	109 585
<b>% change (QQ)</b>	<b>12.3</b>	<b>21.9</b>	<b>-10.4</b>	<b>-27.1</b>	<b>-2.8</b>	<b>-19.0</b>	<b>-16.8</b>	<b>7.1</b>	<b>-16.2</b>
<b>% change (YY)</b>	<b>10.3</b>	<b>-8.3</b>	<b>-6.4</b>	<b>2.5</b>	<b>38.7</b>	<b>-15.5</b>	<b>-38.9</b>	<b>12.3</b>	<b>-12.6</b>

Source: DMR, Mineral Economics

The sulphur market went under another flood of value weight taking following cuts in phosphate production by two noteworthy producers (OCP and Mosaic) in 2015. Confronting instability in monetary and currency markets, financial principals in a few developing economies have been compelled to increase interest rates. Worldwide sulphur production is anticipated to rise by 4 percent per annum, achieving 72 Mt by 2020. The biggest increments will happen in the sulphur exporting regions of West Asia, which is expected to increase by 6 percent for each year. World utilisation of essential sulphur is anticipated to rise at a yearly rate of 3 percent, achieving 69 Mt by 2020.

Sources:

1. DMR, *Mineral Economics*
2. <http://www.idc.co.za/images/download-files/economic-overviews/Economic-Overview-February2016.pdf>
3. *Fertiliser International Magazine Online, 2015-2016* <http://www.fertilizerinternational.com>

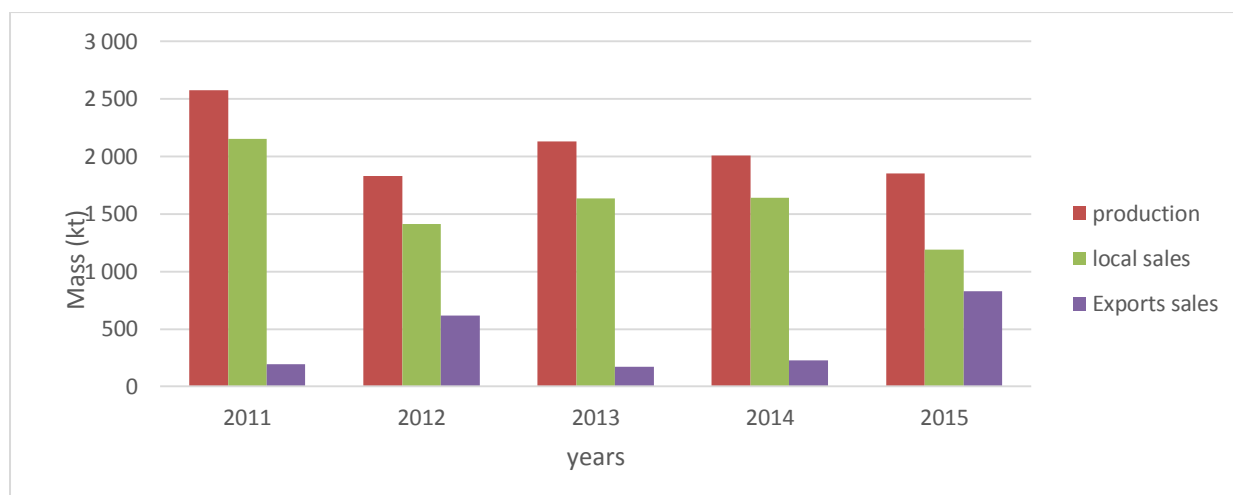
**P Konanani**

#### **14. REVIEW ON SOUTH AFRICA'S PRODUCTION AND SALES OF PHOSPHATE, 2011-2015**

South Africa's phosphate rock has three types of ore deposits which are igneous, sedimentary, modern and ancient guano accumulations. These ores differ in mineralogical, textural and chemical characteristics. Phosphate rock is mined by two companies in South Africa namely, Foskor in Palaborwa and Geckofert in Langebaan. The two companies are occasionally joined by the Elandsfontein Project which was established in 2014. Foskor has been the leading phosphate producer in South Africa since 1940.

Phosphate production has shown a declining trend over the last five years from 2011 to 2015. Production in 2011 amounted to 2 575 kt (Fig 4). During that year, consumers demand for the rock increased on the back of depleting levels. However, production decreased immediately thereafter in 2012 to 1 831 kt, as a result of structural failure of the south Pit crusher stockpile gantry at Foskor. Demand for phosphate rock recovered in 2013 resulting in increased production, but the increase was short lived in subsequent years as a result of downtimes experienced at some operations.

FIGURE 4: SOUTH AFRICA'S PRODUCTION OF PHOSPHATE ROCK, 2011-2015



Source: DMR, Mineral Economics Directorate

The bulk of the phosphate rock produced in the country is used domestically to produce phosphoric acid. Local sales volume of phosphate rock also followed a downward trend from 2 155 kt in 2011 to 1 190 kt in 2015. This decline can be attributed to reduced demand from phosphoric acid and granular fertilizer producers, which declined by 22 percent for phosphoric acid and 33 percent for granular fertilizer amounting to 720 kt and 300 kt respectively compared with the previous year. In 2015, export sales surged by 264.8 percent from 227 kt in 2014 to 828 kt in 2015. Most of the phosphate rock was exported to Europe and Australia.

Despite the downward trend over the years, phosphate remains the key mineral that contributes towards food security. The Government continues to develop programmes towards improving food security in support of the National Development Plan. Currently, a number of projects that are aimed at alleviating food insecurities within the country are in the pipeline, attracting sponsorship from a number of companies within the country and globally. The success of the above mentioned projects will lead to the country being able to supply enough phosphate towards expected demand in the future.

**Sources:**

1. Foskor integrated annual report 2007- 2016
2. Patrick Heffer and Michael Prud'homme, *Fertilizer Outlook 2015-2020*. International Fertilizer Industry Association.
3. DMR, Mineral Economics Directorate
4. [www.IndustrialMinerals.Com](http://www.IndustrialMinerals.Com)

## 15 SOUTH AFRICA UNLIKELY TO SUFFER FROM THE RESOURCE CURSE

*Mining to continue financing growth and sustainable development.*

South Africa (SA) has been a world leader in mining for several decades, estimated as the world's fifth largest sector in terms of Gross Domestic Product (GDP) value. The country is blessed with mineral resources that account for a significant proportion of world production and reserves. The latter remain amongst the world's most valuable, with an estimated worth of more than R20 trillion. While these have translated into some positive developments, SA has experienced some of the symptoms outlined in the resource curse literature, including relatively slow GDP growth, entrenched poverty and less competitive manufacturing industries, leading to fears that the country may be facing or already experiencing the resource curse. However, this is far from the truth.

Also known as *Paradox of Plenty*, resource curse is defined as the paradox that countries and regions with an abundance of natural resources, specifically non-renewable resources like minerals and fuels, tend to have less economic growth than countries with fewer resources, with their wealth often associated with poverty, corruption and conflict, seemingly hindering growth and sustainable development. Research has identified several examples, with China, Korea and some Asian countries being among those high in economic growth and low in natural resources, whereas most African countries, including Gabon and Nigeria, have an abundance of natural resources but low economic growth.

The presence of easily extractable diamonds in Sierra Leone, for example, provided an incentive for violence, with civilians expelled from main mining districts. In addition, rebels used funds harvested from alluvial diamond mines to purchase ammunition from neighbouring countries. In SA, 34 platinum miners were killed in August 2012 while protesting in pursuit of pay raise. This became known as the Marikana Massacre and brought to light the plight faced by mineworkers, particularly poor socio-economic and living conditions. The massacre, although integrally linked with SA's platinum wealth, is not on the same scale as the tragedies and brutalities that have been associated with the resource curse across the continent and to compare it to such a phenomenon appears as gross exaggeration.

Based on World Bank's 2015 figures, SA's economy is the 2<sup>nd</sup> largest in Africa, after Nigeria, and ranked 32<sup>nd</sup> in the world, behind some nations such as Germany, UK, France, Italy and Argentina. The country's GDP improved by an annualized 3.3 percent quarter on quarter in the 2<sup>nd</sup> quarter of 2016, recovering from a 1.2 percent contraction in the previous period thus, beating market expectations of a 2.3 percent increase. It was the highest growth rate

since the 4<sup>th</sup> quarter of 2014, mainly boosted by manufacturing, real estate activities and mining. However, the latter's contribution has been on a steady decline in the last 10 to 20 years. According to the Chamber of Mines (CoM), mining accounted for R234 billion or 7.7 percent of GDP directly in 2015, compared to a 14.7 percent direct share in 1994. Part of the reason for this declining contribution is that the country's mining industry is export-oriented, leaving the local manufacturing industries disproportionately small.

SA's mineral wealth makes it susceptible to the resource curse phenomenon, but to label it as such is a gross ignorance of positive developments, while also ignoring the fact that some of the symptoms were due to unfortunate developments not unique to SA, including the global economic crisis and the resultant drop in commodity prices. Just as South Africa shifted from a primary to a secondary economy with the discovery of gold mining and diamonds, right now the country is making the transition to a tertiary economy. Nevertheless, mining will continue to play an important role in the economy of the country, as a foreign exchange earner and employer of the people.

While it is understandable why many would fear that the country is facing the resource curse, it is equally important to remember that this phenomenon is not necessarily an inevitable consequence of natural resource wealth, and therefore SA need not suffer the fate. Fortunately, it appears unlikely, given the country's foundations such as world-class expertise, sophisticated financial systems, benchmark-setting constitution and the Mineral and Petroleum Resources Development Act (MPRDA), all of which the industry can utilize to make some serious changes to stay relevant, including an increased emphasis on sustainable mining methods which take into account the social and environmental impact of the industry, increased beneficiation, achieving BEE targets and promoting more equitable sharing. Only then can massive revenues from mining be utilized to further finance growth and sustainable development of the nation.

### **Sources**

1. *Directorate Mineral Economics.*
2. *Chamber of Mines Integrated Annual Review, 2015.*
3. *World Trade Organisation, Trade in Natural Resources, 2010.*
4. *HSRC, SA Mining Sector Employment Forecast to 2025.*
5. *KPMG SA Blog, The Role of Mining in the SA Economy.*
6. <http://www.tradingeconomics.com/south-africa/gdp-growth>
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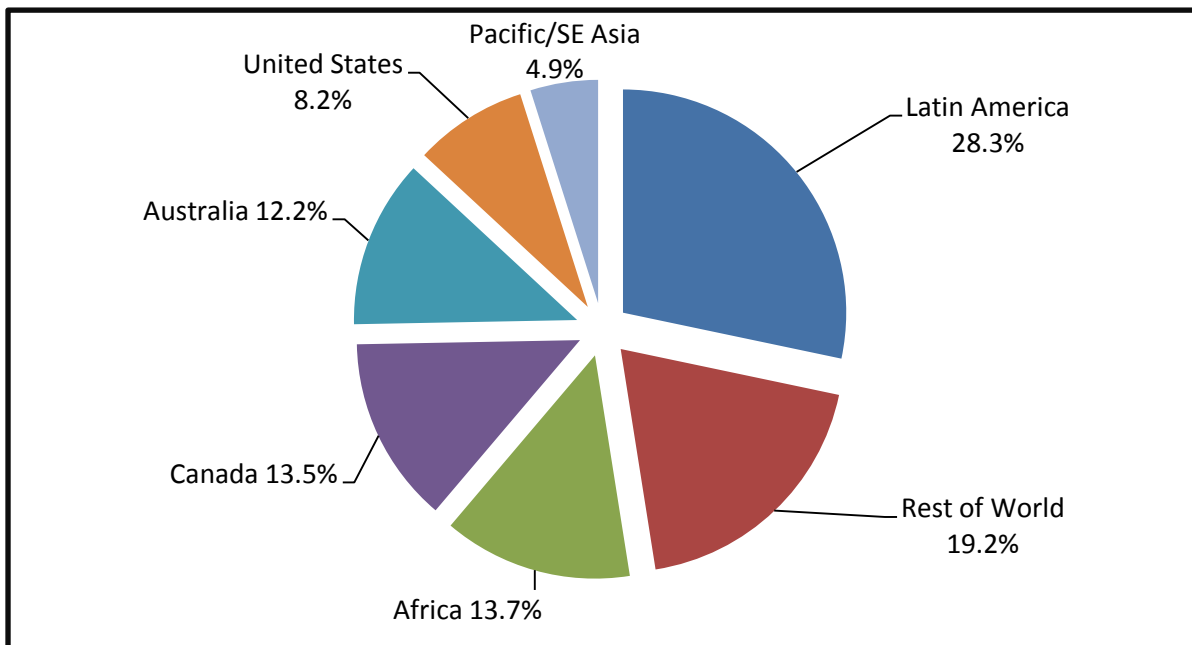
**O Moumakwa**

## 16. DISTRIBUTION OF GLOBAL EXPLORATION EXPENDITURE

Many parts of Africa have long been known to be rich in mineral resources, particularly those in southern and western Africa, which rank among the top ten sources for at least one major mineral. The continent has a majority of the world's known resources of platinum, chromium, and diamonds, as well as a large share of the world's bauxite, cobalt, gold, phosphate, and platinum and uranium deposits. The development of these resources has faced more significant challenges, however, when compared with the experience of more developed mineral-rich countries, such as Australia or Chile. Infrastructure problems seem to be the major constraints to development of these mineral resources, especially bulk mineral deposits which require multibillion-dollar investments in rail and port facilities to allow ore or semi processed minerals to reach their markets.

Largely as a result, Africa's pattern of exploration and mining investment is on decline compared with other regions of the world. Although In recent years, newer players, such as Chinese and Indian companies, have entered the scene, few projects have been developed to the point of production.

FIGURE 5: EXPLORATION EXPENDITURE 2015



The key factor determining investment decisions is the geological potential of a site, and without enough exploration funding it is difficult or rather impossible to identify sites with geological potential. The following seven criteria were used as the basis for the determination of a country's or region's attractiveness to exploration investment

The Behre Dolbear Group of companies which comprised of more than 175 professionals with key offices located in Denver, New York, Toronto, London, Sydney, Hong Kong, and Beijing, carried a survey of 25 countries in 2014, based on the following 7 criteria:

- The country's political system
- The degree of social issues affecting mining in the country
- Delays in receiving permits due to bureaucratic and other issues
- The degree of corruption prevalent in the country
- The stability of the country's currency
- The competitiveness of the country's tax policy

It is not surprising that the Latin America with Chile, Mexico, Brazil and Peru which are in the top ten countries based on the seven criteria attracted 28.3 per cent of global exploration expenditure compared with Africa's 13.7 per cent. This is despite the fact that Africa has significant mineral potential than the Latin American region. Canada with its hostile environment attracted the same amount as Africa, followed closely by Australia.

Probably more surprising is the fact that South Africa with its first class infrastructure and institution is ranked below Botswana, Zambia, Ghana, Namibia and Tanzania.

### **THE CASE OF SOUTH AFRICA**

Examining the seven criteria taken into consideration, it is probably correct to assume that South Africa's **Economic System, Political System, Social issues, Tax Policy** and **Currency stability** are better addressed than most countries in the top five.

- **The country's economic system**
- **The country's political system**
- **The degree of social issues affecting mining in the country**
- **Delays in receiving permits due to bureaucratic and other issues**
- **The degree of corruption prevalent in the country**
- **The stability of the country's currency**
- **The competitiveness of the country's tax policy**

A critical analysis of how the above seven criteria affect investment should help South Africa reverse the current exploration investment trend.

**P Mwape**