SOUTH AFRICA'S MINERAL INDUSTRY

2014/2015

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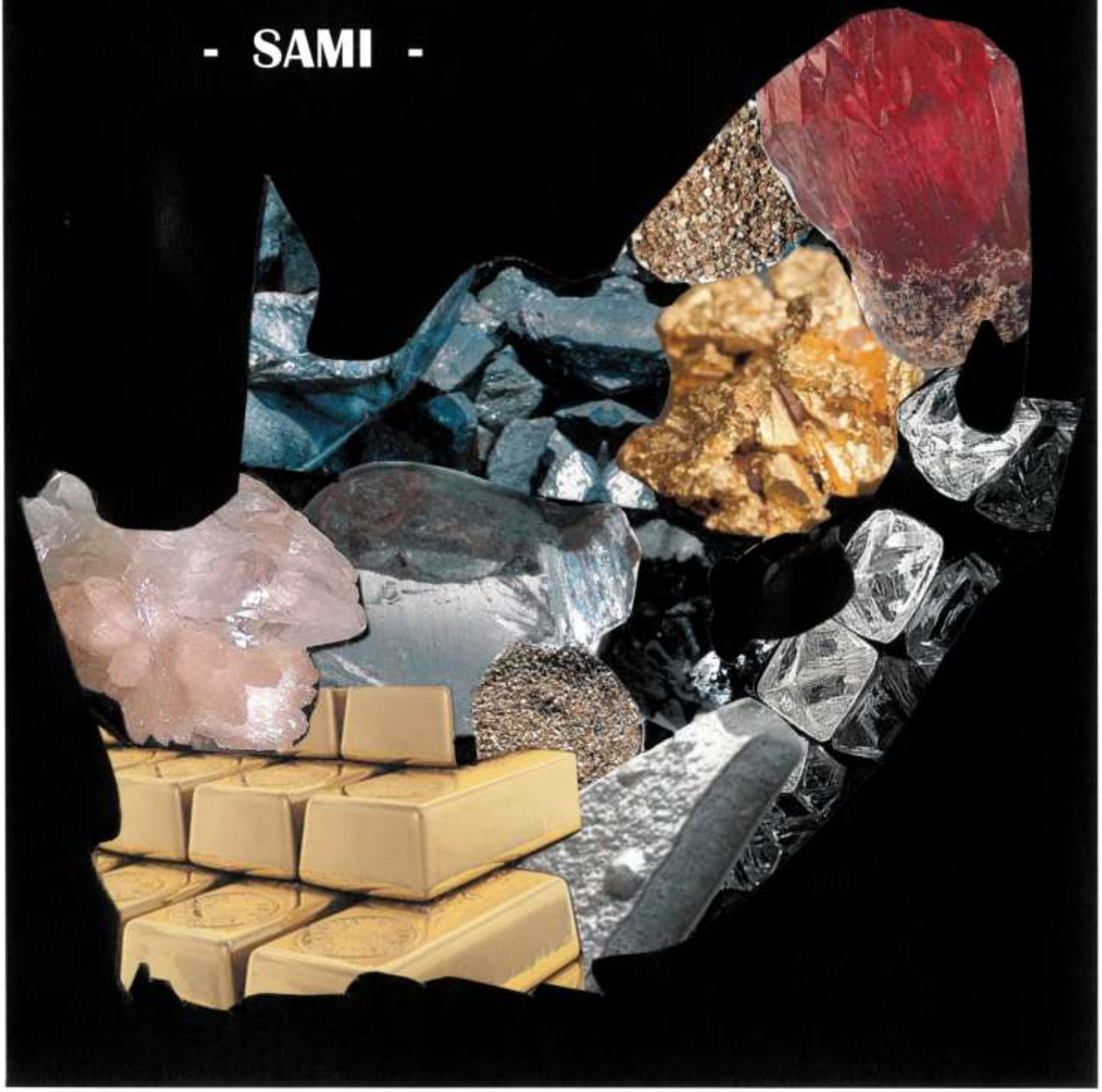

mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

DEPARTMENT: MINERAL RESOURCES
REPUBLIC OF SOUTH AFRICA

Directorate: Mineral Economics

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The cover picture represents South Africa's Minerals Mining Industry.

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FOREWORD

In this, the 32nd edition of South Africa's Mineral Industry publication, the performance of the industry is reviewed, after most commodity prices were very low. The South African mining and minerals sector has significantly contributed to the development of the South African economy having been established over more than 150 year. It is for this reason and more that the South African government's development policies, such as the National development Plan (NDP) and the New Growth Path (NGP), acknowledged the critical role that mining plays in growing investment and contributing to exports, gross domestic product (GDP) as well as job creation. Operation Phakisa which was launched in 2014 to ensure rapid economic development in key sectors, also recognises the critical role that mining sector plays in economic growth. The country has the potential to supply a large share of the global demand for many commodities, but its rich endowment of natural resources and high mineral potential can only be developed and extended through a vibrant exploration sector.

In 2014, the gross domestic product saw a significant increase of R1.8 billion from R284.8 billion in 2013 to R286.6 billion ($26.4 billion), a contribution of 8 percent to gross domestic product (GDP). This increase can be attributed to the rand/dollar exchange rate that saw the rand depreciating from R9.69 to R10.84 to a dollar in 2014 as well as the increase in the production of diamonds and ferrous minerals. During the same period, mining alone employed 2.5 percent of South Africa's economically active population.

Despite being characterised by challenges ranging from labour unrest and sluggish economic growth, 2014 saw a marginal increase of 0.1 percent in primary mineral sales value increasing from R395.4 billion in 2013 to R395. Billion. The highest contributor to total sales revenue was coal at R105.7 billion followed by ferrous and PGMs at R77.5 billion and R88.7 billion respectively. On the other hand, total sales revenue of the selected processed minerals increased by 18.1 percent from R66.7 billion in 2013 to R78.8 billion in 2014, with local and export sales increasing by 24.8 percent and 16.8 percent, respectively.

South Africa's mining industry continues to play an economical and socioeconomic role in the country's development. The country accounts for 96 percent of known global reserves of the platinum group metals (PGMs), 74 percent of chrome, 26 percent manganese, 26 percent of vanadium and 11 percent of gold reserves. As a leading producer and supplier of a range of minerals, the country offers a highly competitive investment location ensuring that it can meet specific trade and investment requirements of prospective investors and business people, whilst also meeting the development needs of its populace.

This paints a picture that despite a myriad of challenges that the sector faces, South Africa remains among the favoured investment destinations. In 2014, a total amount of 3 001 applications for prospecting and mining rights were received by the DMR, a decline of 23.7 percent when compared with 2013's 3933. Of the total number of applications received, 2 859 were for prospecting rights and 142 were for mining rights

In conclusion, it is of paramount importance for me to convey my sincerest appreciation to the staff of Mineral Economics, Economics Advisory Service, as well as the entire staff of Mineral Policy and Promotion Branch for their continued sterling performance in contributing to the compilation of this publication, the industry for its support and cooperation. A Special appreciation is extended to Ms. Nyakallo Dlambulo; Ms. Moretlo Nyabanyaba; Tshegofatso Ndlovu; Mulalo Singo and Mr. Obakeng Mukhari, all of whom left the department but assisted immensely, with contributions. I also wish to welcome into the team, Ncedisa Mahala and Rhudzane Ravhigoni.

Ray Masetlana
Director: Mineral Economics

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ABBREVIATIONS AND SYMBOLS

A$	Australian dollar
bbl	barrel
bbl/d	barrels per day
BGS	British Geological Survey
billion	thousand million
CIF	cost, insurance, freight
CIS	Commonwealth of Independent States. Par of the former Union of Soviet Socialist Republics (USSR)
China	People's Republic of China
CPI	Consumer price index
conc	concentrate carat ct
ct	carat
DM	Deutsche Mark
DMR	Department of Mineral Resources
DRC	Democratic Republic of Congo
DRI	Direct reduced iron
e	estimate
EAF	Electric-arc furnace
EU	European Economic Union
FOB	free on board
FOR	free on rail
FSU	Former Union of Soviet Socialist Republics (USSR)
g	gram
Ga	giga year
g/t	gram per ton
GAR	gross as received
GWe	net gigawatts electric
ILZSG	International Lead and Zinc Study Group
INSG	International Nickel Study Group
kcal	kilocalorie
kg	kilogram
kg/t	kilogram per metric ton
km	kilometre
kt	kiloton
kt/a	kiloton per annum
lb	pound avoirdupois
LME	London Metal Exchange
m	metre
m^3	cubic metre
Ma	million years
mic	metal-in-concentrate
Mct	million carats
Mozt	million ounces troy
Mozt/a	million ounces troy per annum
Mt	megaton (million tons)
Mt/a	million tons per annum
MVA	megavolt ampere
carat	MWh megawatt hour
na	not available
nar	not as received
ns	not specified
NW	North West Europe
ozt	troy ounce
pa	per annum
PGMs	platinum-group metals
ppm	parts per million
R	rand (South African currency)
	SA South Africa
S.ton	Short ton
t	metric ton
t/a	tons per annum
TCF	trillion cubic feet
UAE	United Arab Emirates
US	United States of America
USBM	United States Bureau of Mines
USGS	United States Geological Survey
w	withheld
WBMS	World Bureau of Metal Statistics
y	year
y-o-y	year-on-year
$	US dollar, unless stated otherwise
C$	Canadian dollar
£	British pound sterling
%	percent

EXPLANATORY NOTES

Reference

Due to space limitations, only the sources of statistical information are given. The absence of a source reference to statistical data indicates that such data was sourced from the Directorate: Mineral Economics database of mineral production, sales and labour in South Africa. A bibliography is presented in Part Three.

Mineral Resource

Mineral Resource covers in situ mineralisation as well as dumps or tailings, which have been identified and estimated through exploration/assessment and sampling from which mineral reserves may be derived by the application of modifying factors.

Minerals Reserve

In this publication, mineral reserve refers to the economically mineable material derived from a measured and indicated mineral resource. It includes diluting materials and allows for losses that are expected to occur when the material is mined. Appropriate assessment to a minimum of pre- feasibility study for a project or a Life of Mine Plan for an operation, must have been carried out, including consideration of, and modification by, realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors.

PART ONE: SOUTH AFRICA'S MINERAL INDUSTRY

GENERAL REVIEW

P Mwape, M Mnguni, M Mahote, S Malie and K Menoe

INTRODUCTION

The South African mining and minerals sector has for nearly 150 years, been a pillar of the South African economy while also shaping the country's socio-political and cultural development. The sector has significantly contributed to the development of the South African economy and has formed the foundation of much of the country's economic infrastructure network which underpins jobs in many other sectors. The sector has, amongst others, also directly contributed to the establishment of the Johannesburg Stock Exchange (JSE) in the late 19th century, and today it still accounts for a third of its market capitalisation.

In addition to the direct contribution, mining also has an indirect multiplier effect on the Gross Domestic Product (GDP), contributing directly to country's GDP of between 15 percent and 20 percent. The South African government's development policies, such as the National Development Plan (NDP) and the New Growth Path (NGP), recognise the critical role that mining contributes in growing investments, exports, gross domestic product (GDP) and job creation. In this respect government, organised labour and industry have, through the Mining Industry Growth, Development and Employment Task Team (MIGDETT) undertaken several initiatives aimed at resolving the challenges facing the industry.

Other policy interventions aimed at addressing structural imbalances and tackle high levels of unemployment, poverty and inequality have either been developed or are currently being developed. Principal amongst these are the National Development Plan (NDP), New Growth Path (NGP), Industrial Policy Action Plan (IPAP), the Ten Year Innovation Strategy as well as the Beneficiation Strategy. The IPAP identifies areas where employment could be leveraged and Key Action Plans (KAPs) to achieve the employment growth.

South Africa is driving the African Union's Agenda 2063 which prioritises value-addition and beneficiation of all resources as one of the key initiatives for the continent agenda through the implementation of the NDP and supporting programmes to drive economic growth and development. This includes the 9 point plan for economic development and Operation Phakisa.

Operation Phakisa was launched in 2014 to ensure rapid economic development in key sectors. Phakisa is a results-driven approach, involving setting clear plans and targets, on-going monitoring of progress and making these results public. It focuses on bringing key stakeholders from the public and private sectors, academia as well as civil society and labour organisations together to collaborate.

The mining industry is a well-established and resourceful sector of South Africa's economy and has a high degree of technical expertise as well as the ability to mobilize capital for new development. It has provided the impetus for the development of an extensive and efficient physical infrastructure and has contributed greatly to the establishment of the country's secondary industries. With the diversity and abundance of its natural resources, South Africa is a leading producer and supplier of a range of minerals and produced approximately 53 different minerals from 1 796 mines and quarries in 2014. Gold was produced from 54 mines, platinum-group metals (PGMs) from 51 mines, coal from 155 mines and diamonds from 418 mines, all as primary commodities.

STRUCTURE OF THE MINING INDUSTRY

South Africa, now in its third decade of a constitutional democracy endorsed the principles of private enterprise within a free-market system, offering equal opportunities for its entire people. The State's influence within the mineral industry is not only confined to orderly regulation and the promotion of equal opportunity for all its citizens and investors, but also participates in mining operations through state owned companies like Alexkor, African Exploration Mining and Finance Corporation (Pty) Ltd (AEMFC) and the Industrial Development Corporation (IDC).

Transformation

Corporate restructuring of the South African mining industry remains an ongoing exercise. The introduction of the Mining Charter in South Africa was aimed at transforming the mining industry to redress historical imbalances, so that the industry is aligned with the changes in the country's overall transformation of its social, political and economic landscape.

The transformation of the mining industry has included the consolidation of ownership through minority buy-outs, separation of large diversified companies into two or more specialised companies as well as the purchase of South African mining assets by foreign companies.

Associations involved in the South African mining industry include:

Business

The *Chamber of Mines* of South Africa is a voluntary, private sector employers' organisation founded in 1889, three years after gold was discovered on the Witwatersrand. The Chamber is an association of mining companies and mines operating in the gold, coal, diamond, platinum and other mineral commodity sectors. Today, the organisation acts as the principal advocate of the major policy positions endorsed by mining employers. The Chamber represents the formalised views of its membership to various organs and spheres of government, and to other relevant policy-making and opinion-forming entities, both within and outside the country.

The *South African Mining Development Association (SAMDA),* which was formed in 2000 as a junior mining initiative by a group of people associated with various South African junior and BEE mining companies, aims to create an enabling environment for raising finance, developing technical and other skills, practising responsible environmental management and sustainable development as well as the maintenance of standards of good practice in the junior mining sector.

Voluntary associations

- The Southern African Institute of Mining and Metallurgy (SAIMM) was founded in 1894. The SAIMM is a professional institute with local and international links aimed at assisting member's source news and views about technological developments in the mining, metallurgical and related sectors as well as embracing a professional code of ethics. (www.saimm.co.za).
- South African Colliery Managers Association (SACMA). (www.Sacollierymanagers.org.za)
- Association of Mine Managers South Africa (AMMSA). (www.ammsa.org.za)
- Geological Society of South Africa (GSSA)
- Engineering Council of South Africa (ECSA)
- South African Council for Natural Scientific Professions (SACNASP)

Statutory Associations:

Workers in the mining industry are represented by the following organisations:

- The National Union of Mineworkers (NUM), which was formed on the 4th December 1982. The NUM is the largest recognised collective bargaining agent representing workers in the Mining, Construction and Electrical Energy Industries in South Africa and the largest affiliate of the Congress of South African Trade Unions (COSATU), with offices in all the South African Provinces.
- The United Association of South Africa (UASA) also plays an important role in the international labour arena, joining hands with various international federations that promote global solidarity among workers of the world in their struggle against the negative effects of globalisation of the economy. UASA is affiliated to the International Federation of Transport Workers (FIOST), the International Confederation of Free Trade Unions (ICFTU), and the World Confederation of Labour (WCL).
- Solidarity is another movement, which represents the rights of its members and their communities.
- The African Mineworkers and Construction Union (AMCU) formed in 1999, also represents workers at chrome and platinum mines as well as workers at some coal mines in Mpumalanga and KwaZulu-Natal. It is also recruiting at the iron ore and manganese mines around Kathu and Hotazel in the Northern Cape. It focuses on vulnerable contract workers.

There are also many co-operative organizations, which serve the interests of the smaller groups and independent operators, or specific sectors of the industry. These include the Aluminium Federation of South Africa, the South African Copper Development Association, the Ferro-Alloy Producers Association, the Engineering Industries Federation of South Africa, the Southern Africa Stainless Steel Development Association, the Diggers Association and the Aggregate and Sand Producers Association of South Africa.

Government

Ownership, access and opportunity in regard to the country's mineral and petroleum resources are regulated by the Mineral and Petroleum Resources Development Act of 2002 (Act No. 28 of 2002) (MPRDA), which recognises the State's custodianship over the country's mineral and petroleum resources. The MPRDA regulates the prospecting for, and optimal exploitation, processing and utilisation of minerals, provides for safety and controls the rehabilitation of land disturbed by exploration and mining. This Act defines the entire regulatory environment of the minerals industry, from rights and ownership to mineral sales and beneficiation.

The Act's main objectives are to:

- recognize State custodianship of all mineral and petroleum resources within the Republic of South Africa;
- promote equitable access to the nation's mineral and petroleum resources, especially among historically disadvantaged South Africans;
- promote investment, growth and employment in the mineral and petroleum industry thus contributing to the country's economic welfare;
- provide for security of tenure in respect of existing prospecting, exploration, mining and production operations;
- give effect to section 24 of the Constitution by ensuring that the nation's mineral and petroleum resources are developed in an orderly and ecologically sustainable manner; and
- ensure that holders of mining and production rights contribute towards the socio-economic development of the areas in which they are operating.

Recognizing State custodianship of natural resources has brought South Africa in line with international best practices consistent with UN Resolution 1803 governing States' Permanent Sovereignty over Natural Resources. This more universally recognized mineral rights system has led to the freeing-up of unused old order rights and hitherto effectively sterilized privately-owned mineral rights in prospective mineral terrains, which attracts international exploration and mining companies and increases the level of competition among local players.

The Act also aims to assist historically disadvantaged South Africans aspiring to conduct prospecting or mining activities, with the proviso that such assistance is fair and equitable and does not harm the interests of other parties. The Act provides security of tenure for owners of existing rights, or for those whose applications were being processed at the time of enactment and guarantees security of tenure in respect of prospecting and mining operations. Furthermore, this provided for the holder of an "old order" mineral right an opportunity to comply with the provisions of the Act and also promotes equitable access to the country's mineral and petroleum resources.

The Advantages of the New System of State Custodianship of Mineral Rights in South Africa

- The change from a dual system of ownership to a singular system where the State controls the ownership of mineral rights on behalf of the nation has facilitated access to potential mineral terrains for new entrants into the mining and minerals industry, thus stimulating private sector activity.
- State control of mineral rights removes difficulties in legal and administration costs and delays caused by a fragmented mineral right holdings structure.
- The system of State custodianship of mineral rights enables the state to enforce the submission and release of exploration information, thereby avoiding the duplication of exploration activities.
- State custodianship of mineral rights prevents the hoarding of mineral rights and allows for equal and equitable access to potential investors.

Review of the Mining Charter

The Broad Based Socio Economic Empowerment Charter for the South African Mining Industry (Mining Charter of 2002) was developed on the basis of principles of co-determination with all stakeholders in South Africa's mining industry. This Charter provided for a review after five years in terms of progress

made by all stakeholders. Through the second mandate of the Mining Industry's Growth, Development and Employment Task Team (MIGDETT), which started during the latter part of 2008, competitiveness and transformation were identified as mutually reinforcing attributes that will position South Africa's mining industry along a sustainable growth path. On the 30th June 2010, mining industry stakeholders represented in MIGDETT (Chamber of Mines, SAMDA, NUM, UASA and Solidarity) affirmed their commitment by signing a Declaration on the Strategy for the Sustainable Growth and Meaningful Transformation of South Africa's Mining Industry.

The declaration formed the basis for the Mining Charter review, and basis to the Amended Mining Charter which includes "sustainable development" as an additional element. The Amended Charter was published on the 13 September 2010. In 2009 a baseline assessment of compliance by the mining industry with the requirement of the Mining Charter was conducted. The Department is conducting a second assessment report on compliance for 2014 reporting period. This is the continuation of the initial assessment to ensure that the Department quantifies the compliance levels over this ten year window period.

Other mining policy and legislative amendments

- Chapter XVI of the Mining Rights Act, (Act No 20 of 1967) in the form of the Precious Metals Act, 2005 (Act No. 37 of 2005)
- The Diamonds Act, 1986 (Act No 56 of 1986) in the form of the Diamonds Amendment Act, 2005 (Act No 29 of 2005), and the Diamonds Second Amendment Act, 2005 (Act No 30 of 2005).
- Geosciences Amendment Act, 16 of 2010
- The Geoscience Amendment Act (16/2010) Regulations
- The Housing and Living Conditions Standards for the Mining and Mineral Industry, 2009,
- The Codes of Good Practice for the Mining and Mineral Industry, 2009
- Section 22 (5) Guidelines

The objective of the Precious Metals Act is to provide for the acquisition, possession, smelting, refining, beneficiation, use and disposal of precious metals. Precious metals include gold and the platinum group metals (PGMs). Since silver is produced as a by-product and has a low value (price) compared to other precious metals, it is excluded from the definition of precious metals.

The Diamonds Amendment Acts, 2005 (Act No. 29 of 2005 and Act No. 30 of 2005)

The rationale for the amendment of the Diamonds Act, 1986 (Act No.56 of 1986) was to: increase access to rough diamonds for jewellery manufacturing in South Africa, maintain security of supply of rough diamonds, as well as promote the beneficiation of diamonds in South Africa, thus creating jobs and increasing participation especially by Historically Disadvantaged South Africans throughout the diamond value chain.

Housing and Living conditions for the Mineral Industry

The Housing and Living Conditions were gazetted in April 2009, with the objective of developing basic guidelines for suitable housing and living conditions standards for mine workers.

The codes were first published in April 2009 for implementation as of the 1st of May 2009. The review of the codes initiated in September 2010 was influenced by the need identified by the department to facilitate the creation and development of relevant avenues for human resources and economic development within mining communities. The need identified was also to ensure sustainable development and economic growth in line with the Broad Based Socio-Economic Empowerment Charter for the South African Mining and Minerals Industry.

Drafts of reviewed Codes were developed and referred to the Minister who has since approved them for consultation purposes. The purpose of the review is to outline ethical standards to be adhered to by all mining industry stakeholders in respect of fronting, labour practices, fair business practices, beneficiation, community upliftment, employee welfare, sustainable development and safe mineral exploitation. In the Draft Review of the Codes of Good Practice, stakeholders commit to exercising ethical behaviour, respect for employees' rights and to promote economic development within mine communities.

Extensive consultation with all relevant stakeholders on the Draft Reviewed Codes will be conducted after the Minister has approved the Draft Reviewed Codes document. It is expected that once the Codes of Good Practice are implemented, the industry will reflect the vision of non-racial, non-sexist and prosperous

South Africa. The setting up of administrative principles will also facilitate the effective implementation of the minerals and mining legislation and enhance the implementation of the Broad-Based Socio-Economic Charter as applicable to the mining industry as well as to give effect to section 100(1) (b) of the Mineral and Petroleum Resources Development Act, 2002.

Geoscience Amendment Act 16 of 2010

Following an extensive consultative process, a Draft Amendment Bill was prepared and tabled in Parliament in June 2010. In September 2010, the Bill was considered by the Parliamentary Portfolio Committee and approved by the National Assembly in late November 2010. The President of the Republic assented to and signed the Bill into law on the 3rd of December 2010. The Act was proclaimed by the President on the 28th of May 2012 with the exception of certain sections. The excluded sections were suspended from coming into operation due to a lack of financial resources to implement same by the CGS. These will be put into operation once the CGS has secured the requisite funds from National Treasury.

The main objectives of the Amendment Act are to mandate the Council for Geoscience to be the custodian of geotechnical information, to be the national advisory authority in respect of geo-hazards related to infrastructure and development, and to undertake reconnaissance operations, prospecting, research and other related activities in the mining sector.

The Geoscience Amendment Act (16/2010) Regulations

Consequent to the promulgation of the Amendment Act, the DMR's Mineral Policy Development Directorate, together with the Council for Geoscience, developed Draft Regulations. The purpose of the regulations is to prescribe the processes, procedures and requirements for compliance with the Amendment Act. All the relevant stakeholders will be consulted on the Draft Regulations.

Section 22 (5) Guidelines (MPRDA of 2002)

In March 2011, comprehensive section 22 (5) guidelines were prepared. The purpose of the guidelines is to create an enabling environment for the Department to facilitate the processing of applications made in terms of section 22 (5), which empowers the Minister to exercise his/her discretion by publishing a notice in the Government Gazette inviting applications for mining rights in respect of specific land.

The guidelines are aimed at achieving the following objectives:

- optimal mining of South Africa's mineral resources;
- promotion of investment in the mining and minerals industry;
- equitable access to the nation's mineral resources;
- substantial and meaningful opportunities for historically disadvantaged persons;
- promotion of economic growth and mineral resources development;
- promotion of employment and advancement of the social and economic welfare of all South Africans.

The draft guidelines were approved by the Director General (DG) and the Minister for implementation.

Draft Mineral and Petroleum General Laws Amendment Bill 2014

The objectives of the amendment are to:

- improve the current construct of the Act to remove ambiguities,
- make provision for a comprehensive consultation process with landowners, lawful occupiers and interested and affected parties, make provision for enhanced sanctions,
- stream-line the licensing processes and provide for a single regulatory authority.
- provide for regulation of associated minerals, partitioning of rights and enhance provisions relating to the regulation of the mining industry through beneficiation of minerals or mineral products;
- provide for active State participation in petroleum exploration and production;
- promote national energy security; and
- align the Mineral and Petroleum Resources Development Act with the Geoscience Act, 1993 (Act No. 100 of 1993).

The Amendment Bill was tabled before Parliament in 2013 and dully considered by the Portfolio Committee on Mineral Resources through extensive public hearings involving all interested and affected parties, in

particular, the petroleum industry, environmental groups, the legal fraternity and communities. The DMR responded comprehensively to all concerns raised on the Amendment Bill in this process.

The key provisions of the Bill include among others the introduction of the integrated licensing regime, the concept of active State participation in the exploitation of the nation's petroleum resources, determination of strategic minerals by the Minister, mineral beneficiation, improvements on regulation of Social and Labour Plans (SLP's), substitution of the first come first serve system with an application process by invitation and enhanced sanctions. The Bill has been through both houses of Parliament and was referred by the National Assembly to the President for assent in April 2014. The department awaits the President's assent to the Bill.

International Organisations / Associations

Association of African Diamond Producing Countries (ADPA)

ADPA is an association of diamond producing African countries, 11 of which have full membership while seven only enjoy observer status. The Association is chaired on a rotational basis, for a duration of one year and the current Chair is Ghana. The main focus of ADPA revolves around the implementation of aligned policies and strategies intended to maximize the benefits derived from revenues of diamonds across the African continent. In so doing ADPA explores the development of a best practice document that will promote the realisation of harmonised policies across Africa with a goal to increase foreign investments into the diamond sector for the benefit of all member States.

The Kimberley Process (KP)

South Africa is one of the founding members of the Kimberley Process (KP), which brought into existence the Kimberley Process Certification Scheme (KPCS). The KP was established when diamond producing countries convened in Kimberley, South Africa in May 2000, to discuss ways to stem the trade in *'conflict diamonds'* and ensure that the diamond trade do not fuel armed conflicts. In December 2000, the United Nations General Assembly adopted a landmark Resolution 55/56 of 2000, which supported the establishment of an international certification scheme for rough diamonds. By November 2002, negotiations between governments, the international diamond industry and civil society organisations resulted in the creation of the KPCS, which was launched in Kimberley, South Africa in 2003.

As one of the founding members of the KPCS, South Africa played a pivotal role in the establishment of the KPCS as well as the harmonisation of the regulatory framework relating to the sale and export of diamonds. The KPCS has 54 participants representing 80 countries (including the European Union, which represents 27 states that counts as a single participant accounting for 99.8 precent of the global production of rough diamonds.

The KPCS core document (statutes) governs the global production of rough diamonds and stipulates the objectives, definitions, internal controls and, most importantly, minimum requirements that each participant must comply with. South Africa was 2013 KP chair which marked the 10th anniversary of the establishment of the KPCS. As chair; South Africa hosted the anniversary meetings comprised of the Intercession and Plenary held in June and November 2013, respectively.

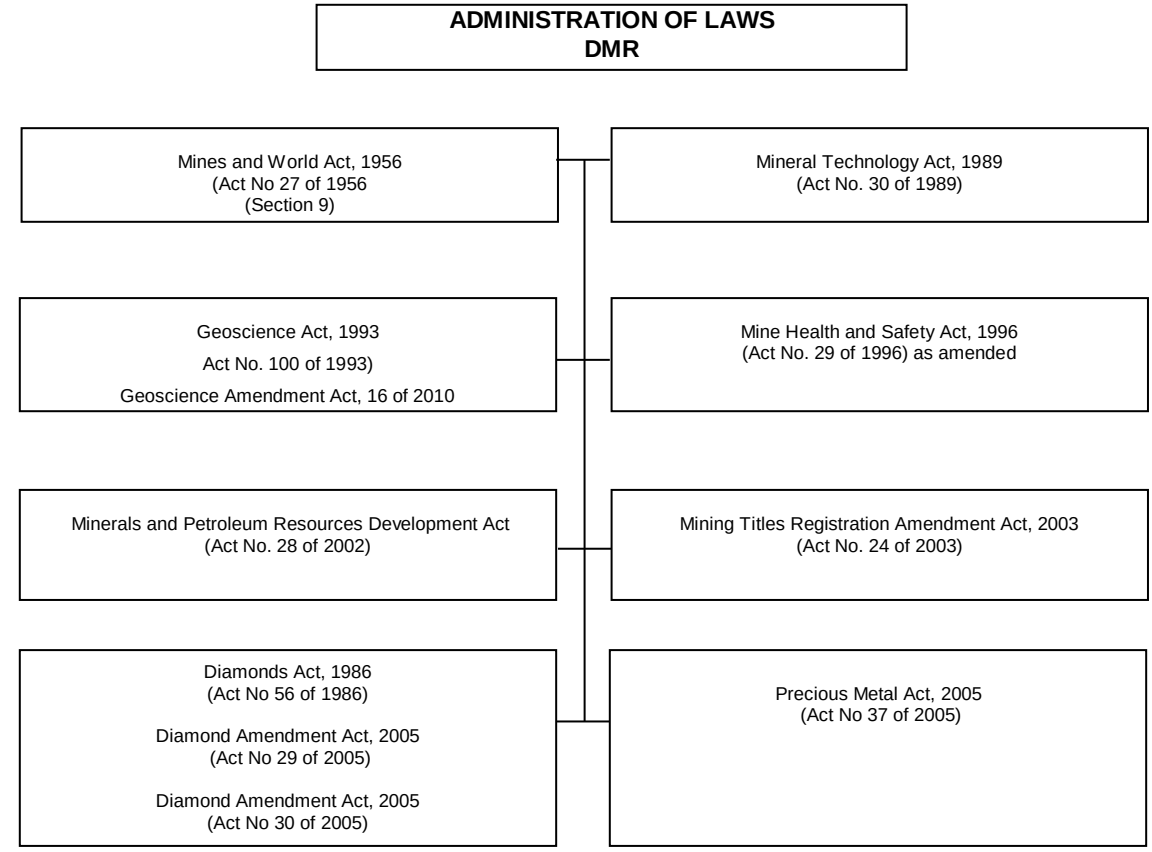
Department of Mineral Resources (DMR)

The Department of Mineral Resources (DMR) is vested with the custodianship of all mineral resources in the Republic of South Africa on behalf of its citizens. To this end, the Department promotes and regulates the Minerals and Mining Sector for transformation, growth and development and also ensures that all South Africans derive sustainable benefit from the country's mineral wealth. Various specialised divisions of the DMR and associated institutions are responsible for the administration of the mining and regulations (Figure 1) and for promoting the development of the industry. Mining is regulated by three branches, namely the Mineral Policy and Promotion Branch, Mineral Regulation Branch and the Mine Health and Safety Inspectorate.

The *Mineral Policy and Promotion Branch* is responsible for formulating minerals and petroleum related policies and helps promote the mining and minerals industry of South Africa in order to make it attractive to investors. The branch consists of four Chief Directorates: *Mineral Policy,* which develops new policies, reviews existing policies and amends legislation to promote investment growth and achieve transformation in the minerals and mining industry; *Economic Advisory Services* that undertakes macroeconomic research and analysis, to inform Executive Management and the department in their engagements with industry

stakeholders; *Mineral Promotion and International Coordination* that promotes mineral development and advises on trends in the mining industry to attract additional investment and *Mine Environmental Management* that provides strategic guidance to mine environmental management and mine closure issues, including the management of derelict and ownerless mines.

FIGURE 1: SUMMARY OF SOUTH AFRICA'S ADMINISTRATION OF MINERAL LAWS



Source: DMR

The *Mineral Regulation Branch* regulates the minerals and mining sector to promote economic growth, employment, transformation and sustainable development. Mineral Regulation is also responsible for the administration of prospecting and mining rights licensing and compliance with the Mineral and Petroleum Resource Development Act, 28 2002 (the Act), including environmental management compliance by mines.

The *Mineral Regulation* branch comprises four Chief Directorates that are accountable for all matters relating to mineral regulation within the nine regions (provinces). The *Central Region* is responsible for Free State and Northern Cape provinces; *Western Region* for Gauteng and North West provinces; *Northern Region* for Limpopo and Mpumalanga provinces; while the *Coastal Region* is responsible for KwaZulu Natal, Eastern as well as Western Cape provinces.

The *Mine Health and Safety Inspectorate* (MHSI) is responsible for implementing mine health and safety legislation. The Inspectorate ensures the safe mining of minerals under healthy working conditions and is represented in the various provinces (regional offices) by Principal Inspectors.

The branch is comprised of two sub – programmes which are: Mine Health and Safety (Regions) responsible for audits, inspections, investigations, enquiries, enforcing the Mine Health and Safety Act and its provisions, examination services and providing professional advice; and Governance Policy which provides technical support to regional offices, chairs tripartite structures and facilitates HIV and AIDS work in the sector.

Through the *Mine Health and Safety Council* (MHSC), the inspectorate provides leadership and participates in initiatives and activities of tripartite institutions to respond to current health and safety challenges. The MHSC is a national public entity (schedule 3A) established in terms of the Mine Health and Safety Act, No 29 of 1996 as amended. The main task of the Council is to advice the Minister of

Mineral Resources on occupational health and safety legislation and research outcomes focused on improving and promoting health and safety in South African mines.
The MHSC continues to respond to health and safety challenges through implementation of focused programmes addressing milestones agreed upon by stakeholders (labour, state and employers) during their health and safety summit in 2003.

Resolutions made included that the mining sector will achieve a 20 percent decline in fatality and injury rates per year and eliminate Silicosis and Noise Induced Hearing Loss by 2013. The setting, monitoring and enforcement of health and safety standards within the South African mining industry are regulated under the Mine Health and Safety Act 1996, (Act No. 29 of 1996). The Mine Health and Safety Act 29 of 1996 ("MHSA"), referred hereto as the Principal Act, was published in the Government Gazette in June 1996 and came into operation on the 15th of January 1997. The Principal Act was amended in 1997 by the Mine Health and Safety Amendment Act 72 of 1997, with minimal changes.

In 2008 the Principal Act was further amended in details by the Mine Health and Safety Amendment Act 74 of 2008. This Act 74 of 2008 addressed some challenges and shortcomings that had been identified over the years in the mining industry with regard to the enforcement of the MHSA. This Amendment Act came into operation on the 1st of May 2009. Currently, the Mine Health and Safety Act is being reviewed comprehensively, with view to:

- strengthen enforcement provisions; to simplify the administrative system for the issuing of fines;
- reinforce offences and penalties; to substitute and remove ambiguities in certain definitions and expressions; and
- effect certain amendments necessary to ensure consistency with other laws, particularly the Mineral and Petroleum Resources Development Act, 2002 (MPRDA).

The DMR in association with the following highly specialised associated institutions of government conducts regulatory, promotional and various research activities

- The Council for Geoscience (CGS) undertakes geological mapping and carries out studies pertaining to the identification, nature, extent and genesis of ore deposits and also maintains national databases of the country's geoscientific data and information.
- Council for Mineral Technology (Mintek) assists the minerals industry to operate more effectively by developing and making available, the most appropriate and cost-effective mineral recovery and mineral beneficiation technologies. It is engaged in the full spectrum of minerals research: from the mineralogical examination of ores to the development of processing, extraction and refining technologies and also conducts research into: the production of added value products and feasibility and economic studies. Much of this work is carried out in close liaison with the local and international minerals and metallurgical industries.

- The South African Nuclear Energy Corporation (NECSA) undertakes and promotes research and development in the field of nuclear energy technology and radiation sciences in order to process source material, special nuclear material and restricted material as described in Nuclear Energy Act, No 146, 1999, Sections 2(a), 2(b) and 2(c).

- The Council for Scientific and Industrial Research (CSIR) conducts, *inter alia*, research related to specific minerals, brown fields mineral exploration, air quality, water pollution and purification, as well as mining and mineral processing technologies. The CSIR's Division of Natural Resources and Environment in the mining category focuses its research and development on the mining industry. Major research activity in this division focuses on the most crucial challenges threatening the health and safety of the underground workforce and overcoming a variety of technological challenges that impact on profitability in the mining industry. The division conducts fundamental research and technology development and provides general advice and assistance relating to the improvement of the underground environment and strata control, reduction of hazardous conditions associated with rock pressure in mining operations, as well as development of new or improved mining systems and equipment.
- The South African Diamond & Precious Metals Regulator (SADPMR) was established by Section 3 of the Diamonds Act, 1986 (as amended in 2005), and replaced the South African Diamond Board which was de-listed as a Schedule 3A public entity in March 2007. The South African Diamond Board was established in 1987 in terms of the Diamond Act, Act 56 of 1986 to regulate control over possession, the purchase and sale of diamonds, and the processing and the export of diamonds.

- The State Diamond Trader (SDT) is a state owned entity established in terms of Section 14 of the Diamonds Amendment Act, 29 of 2005. The SDT's main business is to buy and sell rough diamonds in order to promote equitable access to and beneficiation of diamond resources. The main aim of the SDT is to address distortions in the diamond industry and correct historical market failures to develop and grow South Africa's diamond cutting and polishing industry. The entity is empowered by law and proclamation to purchase up to 10% of the run of mine stones from all diamond producers in South Africa, and to sell to registered customers through an application and approval process.

- Petroleum Agency South Africa (PASA) promotes exploration for onshore and offshore oil and gas resources and their optimal development on behalf of government, as designated in terms of the Mineral and Petroleum Resources Development Act (MPRDA). The Agency regulates exploration and production activities, and acts as the custodian of the national petroleum exploration and production database.

- Most of South Africa's institutions of higher education (universities and universities of technology) are not only responsible for the training of professional and technical personnel required by the mineral industry but also undertake mineral and/or mining research. The mining industry strives to conform to strict professional ethics and competitive technical practices through organisations such as the Geological Society of South Africa (GSSA), the Southern African Institute of Mining and Metallurgy (SAIMM) and the South African Council for Natural Scientific Professions (SACNASP). The Mining Qualifications Authority (MQA) plays a critical role by addressing skills shortages in the mining industry through capacity development and process improvement. The MQA as established by the MHSA, No. 29 of 1996, is mandated to ensure that the mining and mineral sector has sufficient competent people who will improve health and safety.

INFRASTRUCTURE DEVELOPMENTS

South Africa ranks among the most sophisticated and promising emerging markets in the world. The unique combination of a well-developed first-world economic infrastructure and a rapidly emerging market economy, has given rise to an entrepreneurial and dynamic investment environment with many global competitive advantages and opportunities. Being a leading producer and supplier of a range of minerals, the country offers a highly competitive investment location ensuring that it can meet specific trade and investment requirements of prospective investors and business people, whilst also meeting the development needs of its populace.

South Africa's banking system is well-developed, which sets it apart from many other emerging economies, offering a mature market with a good regulatory and legal framework. The South African Reserve Bank (SARB) oversees the local banking services industry. The non-banking financial services industry is governed by the Financial Service Board (FSB). The South African banks are well capitalised and managed; and have sophisticated risk-management systems and corporate-governance infrastructure comparable to First World economies.

Transnet

South Africa boasts the most modern and extensive infrastructure in Africa, with a highly developed transport infrastructure consisting of an extensive road and rail networks. Transnet is a public company wholly owned by the government and is a dominant player in the Southern African transport sector, supporting the country's freight logistics network. Its activities extend beyond the borders of South Africa into Africa and the rest of the world. The company has five operating divisions that drive business value creation, namely; Transnet Freight Rail (TFR), Transnet Engineering (TE), Transnet National Ports Authority (TNPA), Transnet Port Terminals (TPT) and Transnet Pipelines (TP). Transnet has also three specialist units: Transnet Property (TP), Transnet Capital Projects (TCP) and the Transnet Foundation (TF).

Transnet remains a major investor in the South African economy and has committed to expansion and replacement capital expenditure of R336.6 billion on capital projects, over a seven year period, which would create 588 000 jobs. Transnet adopted the Market Demand Strategy (MDS) in 2012; the successful execution of the MDS will result in an increase in rail, port and pipeline capacity ahead of market demand. Through Transnet's MDS, capital invested for 2014 increased by 5.7 percent to R33.6 billion, from R31.8 billion in 2013.

An amount of R14.5 billion was invested in the expansion of infrastructure and equipment and R19.1 billion was invested to maintain capacity in the rail and ports divisions. Transnet spent R6.9 billon to conclude a number of locomotive contracts which will results in approximately 1 200 new locomotive for the General Freight Business (GFB). The company transported 210,4mt of General Freight Business (GFB) volumes during the year 2014. The New Multi-Product Pipeline (NMPP) connecting Durban with Johannesburg will ensure the supply of liquid fuels over the long term. R23.9 billion has been invested in the NMPP project since its inception, with the investment for 2014 amounting to R2.5 billion.

TFR is the largest division within Transnet, representing the group's rail freight transport interests. It transports bulk and containerised freight by rail. The network and rail services provide strategic links between ports and production hubs and connect with the railways of the SADC region. The Rail network unit manages Freight Rail's infrastructure and focuses on the maintenance, modernisation and expansion of the approximately 20 500 route kilometre (31 000 track km) rail network. About 1 500 km comprises heavy–haul lines for coal and iron ore export. There are dedicated railway lines for iron ore from Sishen, in the Northern Cape to Saldanha Bay on the west coast, and for transporting coal from the coal fields of Mpumalanga to the Richards Bay Coal Terminal (RBCT) on the east coast.

Portnet, a subsidiary of PSA Corporation Limited, was formed in 2000 with the aim of helping the port and shipping to increase productivity and save costs through the greater use of information technology and the internet. Portnet is the largest port authority in Southern Africa, with the best-equipped and most efficient network of ports in Africa. The network connects the ports of South Africa and the rail networks of the Sub-Saharan region. Most of South Africa's minerals are exported through five major ports, the largest of which is Richards Bay Coal Terminal (RBCT) with the capacity of 92 Mt per annum mainly for coal exports.

The coal line is the main channel for export coal, which starts with the mines in Mpumalanga and ends at the port of Richards Bay Coal Terminal (RBCT). Plans are in place to increase rail capacity to 81.0mpta in the near term and thereafter to 97.5mpta in the medium to long term. The total expansion and sustaining capital investment for the coal and mineral system programme is estimated at R40,7 billion over the next seven-year period of the Market Demand Strategy (MDS). For 2014, R411 million has been invested in the coal line expansion for upgrading yards. South Africa's coal exports are mostly sent to India, China, and Europe. Demand drivers include growth in demand for seaborne thermal coal and other minerals to be exported to China and India that would sustain the major expansion in global trade, and also Eskom rail migration programme that will introduce incremental capacity to 24mpta.

The iron ore line is the main export channel for iron ore from the mines in the Northern Cape to the Port of Saldanha. The prefeasibility study for Sishen-Saldanha Corridor Expansion programme has been completed. The first phase will unlock corridor capacity of 75 mtpa up from the current capacity of 60 mtpa. The feasibility study will take approximately 13 months, starting in the last quarter of 2015. Construction is anticipated to begin in the second half of 2017 and be completed by 2023.

The upgrade of the rail network between Hotazel and Ngqura and the provision of a new bulk terminal in the Port of Ngqura will increase the manganese export capacity to 16 mpta by 2019. The project aims to retain South Africa's position as the leading exporter of high-grade manganese ore. The total of R466 million has been invested to date and construction planning has commenced for the remaining port and rail investments. The expected completion date is April 2017.

Eskom

Eskom was established in South Africa in 1923 as the Electricity Supply Commission. In July 2002, it was converted into a public, limited liability company, wholly owned by government. Eskom is a vertically integrated operation that generates, transmits and distributes electricity to industrial, mining, commercial, agricultural, residential customers and redistributors. According to South Africa's Department of Energy (DOE), Eskom supplies roughly 95 percent of South Africa's electricity and the remainder comes from independent power producers (IPPs) and imports. Eskom buys and sells electricity with countries in the region. South Africa plans to diversify its electricity generation mix. Currently, about 90 percent of South Africa's generation capacity is from coal-fired power stations, about 5 percent from one nuclear power plant, and 5 percent from hydroelectric plants, with a small amount from a wind station, according to South Africa's DOE. South Africa's renewable energy industry is small, but the country plans to expand renewable electricity capacity to 18,200 MW by 2030. South Africa has one nuclear power plant, Koeberg, with installed capacity of 1,940 MW. The country plans to expand nuclear power generation by 9,600 MW by 2030. Eskom is ranked among the top ten utilities in the world in terms of generation capacity.

Eskom started the capacity expansion programme in 2005 to build new power stations and high-voltage transmission power lines to meet South Africa's rising demand for electricity and also to diversify our energy mix. The programme, which started with the return-to-service (RTS) programme and is currently expected to be completed by 2021, will increase generation capacity by 17 384MW, transmission lines by 9 756km and substation capacity by 42 470MVA. Since inception, the capacity expansion programme has resulted in additional generation capacity of 6 237MW, mainly through the RTS programme 5 816km of transmission lines and 29 655MVA of substation capacity. The programme has cost R265 billion to date, while the total cost-to-completion of the programme is currently estimated at R361 billion.

Eskom is projected to spend over R200 billion for the supply of coal over a period of five years. The aim is for the power utility to procure more than 50 percent of its coal from emerging black coal miners by 2018. In May 2013, the Minister of Public Enterprises launched the Black Emerging Miners Strategy to increase black participation and ownership in the coal-mining sector. A key element of the strategy is to establish a mine development fund to provide finance for the development of mines, mainly at the early exploration stage. The fund started operating at the end of 2013/14. Eskom finalised its build programme and that about 82 percent of funding had been secured. So far, Eskom spent about R186 billion and will spend another R337 billion over the next five years, to complete the Medupi, Ingula and Kusile power stations. Medupi is only expected to be fully operational by the end of 2019, with total capacity of 4 764MW and the additional 4 800MW by 2021, while Ingula is anticipated to be fully operational by 2017 with capacity of 1 332MW.

South Africa has a sizeable labour pool and a Human Development Index (HDI) survey, conducted by the United Nations in about 187 countries, places South Africa at 118 as a medium human development country. The Government, through the Amended Skills Development Act of 2003 tightened regulations to ensure continuous improvement in the skill development strategies across all sectors. The Mining Qualifications Authority (MQA) is responsible for the provision and administration of skills development projects for the mining and minerals sector.

The Infrastructure development and Human Resource development is critical to achieving the country's New Growth Path (NGP) which was introduced in 2010. The NGP sets out a vision for creating a competitive, fair and socially cohesive economy. The NGP also puts employment at the centre of economic policy. It identifies how greater efficiencies can be achieved in the economy, and the investments needed to create an advanced modern infrastructure. The NGP is expected to create large-scale, sustainable jobs in key sectors through a collaborative approach. This will encourage trade, innovation and economic growth of up to 7 percent per annum and will ensure South Africa remains at the forefront of fast growing emerging economies and also as an attractive investment destination. The successful implementation of the NGP is also expected to increase investment in South Africa's mineral industry by ensuring the continuation of a competitive business environment and the lowering of barriers to entry. The Southern African subcontinent will also benefit from improved regional co-operation, seeking to harmonize legislation governing the mining industry.

MINERAL INDUSTRY STRENGTH

South Africa's mineral wealth has been built on the country's enormous resources most of which are usually found in the following distinctive geological structures and settings:

- The Witwatersrand Basin yields some 93 percent of South Africa's gold output and contains considerable resources of uranium, silver, pyrite and osmiridium;
- The Bushveld Complex hosts platinum group metals (with associated copper, nickel and cobalt mineralisation), chromium and vanadium bearing titanium iron ore formations as well as large deposits of the industrial minerals, including fluorspar and andalusite;
- The Transvaal Supergroup contains enormous resources of manganese and iron ore;
- The Karoo Basin extends through Mpumalanga, KwaZulu-Natal, Free State as well as Limpopo Province hosting considerable bituminous coal and anthracite resources and shale gas discoveries;
- The Palaborwa Igneous Complex hosts extensive deposits of copper, phosphate, titanium, vermiculite, feldspar and zirconium ores;
- Kimberlite pipes host diamonds that also occur in alluvial, fluvial and marine settings;
- Heavy mineral sands contain ilmenite, rutile and zircon;
- Significant deposits of lead-zinc ores associated with copper and silver are found in the Northern Cape near Aggeneys.

South Africa accounts for 96 percent of known global reserves of the platinum group metals (PGMs), 74 percent of chrome, 26 percent of manganese, 26 percent of vanadium and 11 percent of gold reserves (Table 1). Since most of the identified mineral resources and reserves were discovered by means of obsolete exploration methods, there is still significant potential for the discovery of other world-class deposits in areas not yet thoroughly explored using modern exploration technologies. As a major mining country, South Africa's strengths include a high level of technical expertise as well as comprehensive research and development activities.

TABLE 1: SOUTH AFRICA'S ROLE IN WORLD MINERAL RESERVES, PRODUCTION AND EXPORTS, 2014

COMMODITY	RESERVES				PRODUCTION				EXPORTS			
	Unit	Mass	%	Rank	Unit	Mass	%	Rank	Unit	Mass	%	Rank
Alumino-silicates	Mt	51	*	*	*	*	*	*	*	*	*	*
Antimony	kt	27	1,5	5	t	815	0,5	6	t	758	*	*
Chrome Ore	Mt	6 860	73,7	1	kt	14 038	43,5	1	kt	3 695	50,8	1
Coal	Mt	66 700	7	5	Mt	261,4	3	7	Mt	75,4	5,4	6
Cobalt	Kt	32	0,4	11	kt	1,3	1,2	11	kt	0,8	*	*
Copper	Mt	11	1,6	11	kt	79,0	0,4	26	kt	37	*	*
Diamonds		*	*	*	Mct	8,1	6,5	7	Mct	7,7	*	*
Ferro-chrome		*	*	*	kt	3 719	37	1	kt	3 192	55,2	1
Ferro-Mn/Fe-Si-Mn		*	*	*	kt	970	*	*	kt	659	*	*
Ferro-silicon		*	*	*	kt	135	2,4	7	kt	71	3,1	5
Fluorspar	Mt	41	17,1	1	kt	164	3,4	4	kt	131	*	*
Gold	T	6 000	10,9	2	t	151,6	5,5	6	T	136,0	*	*
Iron Ore	Mt	650	0,74	12	kt	80 759	2,5	7	kt	61 962	4,3	3
Lead	kt	0,3	0,3	10	kt	29,0	0,5	18	kt	33	*	*
Manganese Ore	Mt	150	26,3	1	kt	13549	26,1	1	kt	9296	30,8	1
Nickel	Mt	3,7	5	7	kt	55	2	11	kt	48,1	*	*
PGMs	t	63 000	95,5	1	t	188,4	*	*	kt	201,5	*	*
Phosphate Rock	Mt	1 500	2,3	5	kt	2 011	0,9	12	kt	227,3	*	*
Silicon Metal		*	*	*	kt	47,2	1,1	8	kt	40,8	4,5	6
Silver		*	*	*	Moz	1,2	0,1	20	Moz	1,8	*	*
Titanium Minerals	Mt	63	9	4	kt	1025,6	24,6	1	kt	962,9	*	*
Uranium	ktU	338[#]	6	7	ktU	0,7	0,9	11	ktU	*	*	*
Vanadium	kt	3 640	26	3	kt	21,5	27,7	2	kt	13,7	*	*
Vermiculite	Mt	14	*	*	kt	143,0	35,8	1	kt	144,4	*	*
Zinc	Mt	15	6,5	5	kt	26	0,2	31	kt	28	*	*
Zirconium	Mt	14	18	2	kt	398	23	2	kt	431	*	*

Sources: *USGS, BP statistical review of world energy 2013, Mineral Economics Directorate,*
Notes: *Full details given in respective commodity chapters*
** Information not available*
[#]Resource

PRODUCTION OVERVIEW OF SELECTED MAJOR MINERALS

TABLE 2: SOUTH AFRICA'S PRODUCTION OF SELECTED MAJOR MINERALS, 2010 – 2014

COMMODITY	UNIT	PRODUCTION				
		2010	2011	2012	2013	2014
Coal	t	257 205 807	250 706 255	258 575 793	255 019 489	260 642 387
Cobalt	t	840	862	1 102	1 294	1 332
Copper	t	83 640	89 298	69 859	80 821	78 697
Chromite	t	10 871 095	11 865 380	11 310 223	13 652 883	14 037 722
Diamonds	ct	8 870 967	7 117 887	7 245 403	8 143 256	8 046 050
Gold	kg	188 702	180 293	154 178	159 472	149 634
PGMs	kg	287 304	288 851	254 338	264 188	188 444
Nickel	t	39 960	43 321	45 945	51 208	54 956
Lead	t	50 625	54 460	52 489	41 848	29 348
Manganese	t	7 171 745	8 651 842	8 943 415	11 055 658	14 051 244
Iron Ore	t	58 709 330	58 056 897	67 100 474	71 533 814	80 759 334
Zinc	t	36 142	36 629	37 034	30 145	26 141

Source: Department of Mineral Resources, Directorate: Mineral Economics

Table 2 above shows that while some commodities recorded marginal changes in production, there were notable changes in Coal, Chrome, Nickel, Lead, Manganese and Iron ore. During 2014, Manganese and Iron ore production recorded highest increases of 27 percent and 13 percent respectively.

MINERAL EXPLORATION

Well managed natural resources have played significant role in transforming economies worldwide. However mineral resources being wasting assets require that we increase them as we mine through adequate exploration funding. According to U.S Geological Surveys (USGS), Global exploration expenditure amounted to US$10.7 billion down from US$14.43 billion in 2013 and US$ 20.53 billion in 2012. The decrease was due to weak commodity prices due to poor economic global data from most economies such as Europe and China. Consequently, investors are somehow reluctant to invest in the mining industry at current commodity prices and rising production costs. This has also impacted on the junior companies' ability to raise fund for exploration. Generally, recent and anticipated mineral commodity prices will contribute to exploration budget development and the amount of activity planned by mineral exploration companies. However, over and above commodity prices, fluctuating currency exchange rates and increased exploration costs are among the considerations used by companies in determining exploration targets and development plans. This may explain why not enough exploration expenditure is going to Africa, given the enormous potential the continent has. The amount attributed to late-stage exploration however increased while early stage exploration budget which is left for junior exploration companies decreased by 32 per cent in 2014, according to SNL Metals and Mining 2014. Worldwide exploration expenditure of US$10.7 billion allocated for nonferrous mineral exploration was 26 per cent less than the US$14.43 allocated in 2013. During the period under review, Latin America attracted the largest portion of global expenditure at 27 per cent, followed by Africa at 16 per cent, while Canada and Australia attracted 14 per cent and 12 per cent respectively (Figure 3). The 2014 exploration budgets in all regions were lower than the corresponding budgets in 2013 (Figure 2). The regions with the smallest decrease in exploration budgets were the USA and the rest of the world, while the largest current dollar reduction in budget for 2014 occurred in Latin America and Africa...

During the period under review, allocations for top ten rankings remained the same with Canada and Australia remaining the top contributing countries to global exploration expenditure at 14 per cent and 12 percent, respectively.

Exploration Activity by Mineral Commodity

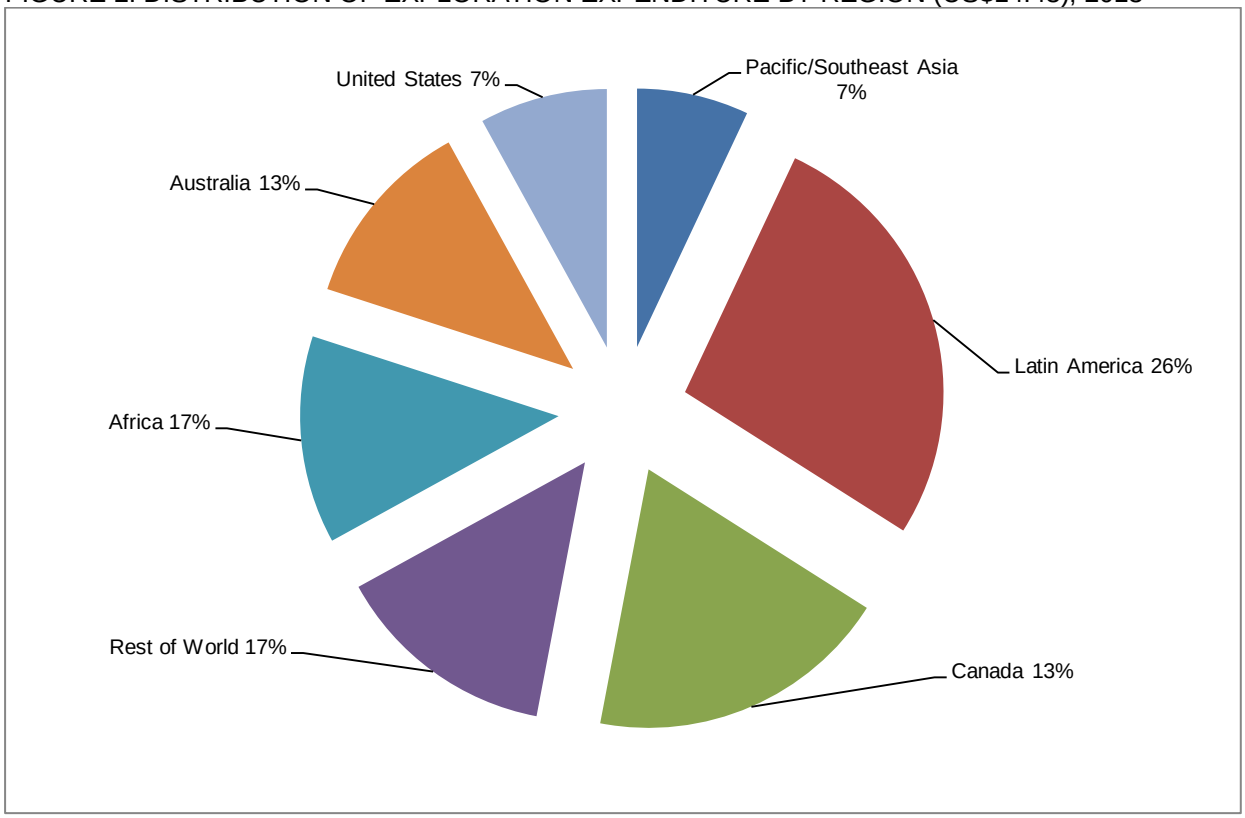
Based on SNL data, the amount budgeted for gold exploration for 2014 was US$4.6 billion, accounting for 43 per cent of the total global expenditure. Exploration budget for base metal projects accounted for US$3.7 billion, down from US$4.7 billion in 2013. Exploration for copper accounted for over 70 per cent of the base metal budget of 2014. Countries with the largest exploration budget for copper in 2014, in descending order by budget, were Chile, Australia, Peru, the Democratic Republic of Congo (DRC), USA,

Canada, China, Zambia, Mexico and Brazil. The budget for diamond exploration decreased by 9 per cent in 2014 in current dollar terms to US$400 million. Principal locations for diamond exploration in 2014 were Russia, Canada, Angola, Botswana and South Africa. The 2014 exploration estimates for Platinum Group Metals (PGM) of about US$200 million was 50 per cent up from the 2013 budget and the principal areas for planned PGM exploration were South Africa, Canada, and Russia. The budget estimate for uranium exploration decreased from US$616 million in 2013 to about US$504 million in 2014.

Africa, with its rich mineral endowment and potential attracted only about US$1.7 billion, 16 per cent of the total global expenditure in 2014, down from US$2.4 billion attracted in 2013, a reduction of 29 per cent. According to SNL, countries with the greatest exploration activity in 2014 were DRC, South Africa, Burkina Faso, Zambia, Tanzania, Ghana, Mali, Angola and Namibia, in descending order. Based on site data compiled by the USGS, gold projects accounted for 43 per cent of the reported African exploration projects, 17 per cent were copper projects, 9 per cent iron ore projects, 5 per cent uranium projects, 5 per cent lead or zinc, 5 per cent PGM projects, 5 per cent diamond projects, while the remaining 11 per cent targeted other minerals.

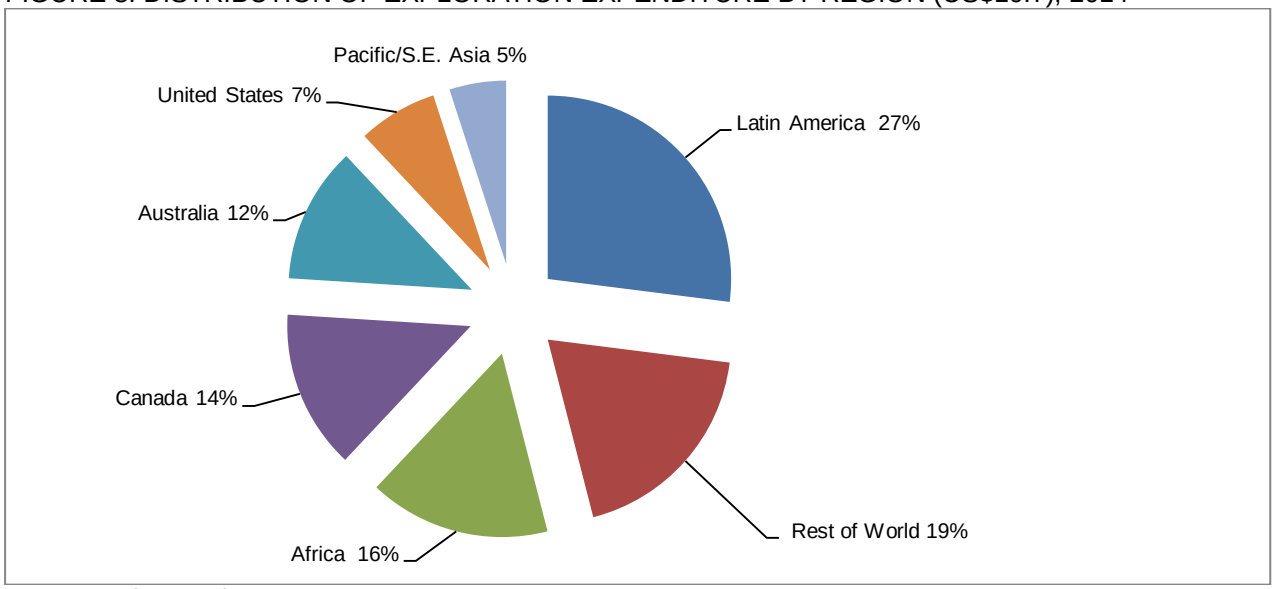
The African mining sector faced a number of challenges in 2014 that affected the level of mineral exploration. In additional to global economic uncertainty the African continent is faced with critical shortage of appropriate infrastructure such as roads, energy coupled with labour unrest like the five month labour strike in the South African PGM sector. The labour strike in South Africa may have reduced investor confidence in mining investment in Africa. Lack of reliable geological data and confusing regulations may also influence level exploration activity. The World Bank announced a plan to initiate US$1 billion program to map African mineral resources beginning in 2014. This will greatly improve reliability of the geological data and possibly increase more investment in mineral exploration on the continent.

FIGURE 2: DISTRIBUTION OF EXPLORATION EXPENDITURE BY REGION (US$14.43), 2013



Source: Metal Economics Group, 2013

FIGURE 3: DISTRIBUTION OF EXPLORATION EXPENDITURE BY REGION (US$10.7), 2014



Source: Metal Economics Group, 2014

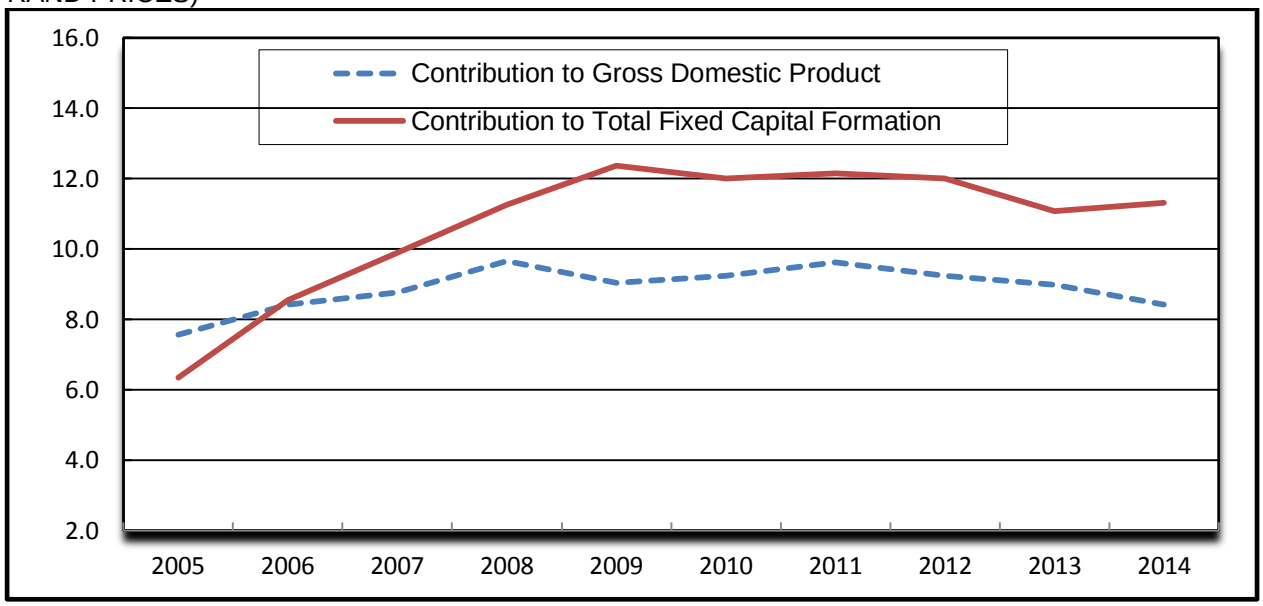
In 2014, a total amount of 3 001 applications for prospecting and mining rights were received by the DMR. Of the total number of applications received, 2 859 were for prospecting rights and 142 were for mining rights. . The country has the potential to supply a large share of the global demand for many commodities, but its rich endowment of natural resources and high mineral potential can only be developed and extended through a vibrant exploration sector.

The depleting nature of the mineral resources necessitates that South Africa refocuses its support towards investment in Greenfield exploration, in order to sustain the mining industry through the discovery of new deposits. Mineral exploration investment as prescribed under the sustainable development element of the Mining Sector Declaration, amongst other factors, was identified as one of the key elements in growing and developing the mining industry.

ROLE OF MINING IN THE NATIONAL ECONOMY

Mining industry is one of the country's key economic sectors with potential for substantial contribution to economic growth, job creation and transformation, consistent with the government's objectives of higher and more balanced economic and inclusive growth. In 2014, mining contributed R286.6 billion ($26.4 billion) or 8 percent to gross domestic product from R284.8 billion in 2013 (Figure 4 and Table 3), an increase of R1.8 billion over the previous year. The increase in value added in rand terms by mining increased despite the sluggish prices of most commodities. This increase can be attributed to the rand/dollar exchange rate which depreciated from R9.69 in 2013 to R10.84 in 2014 and the increase in the production of diamonds and ferrous minerals. If the value-added contribution of processed minerals (presently included in the manufacturing sector's figures) were added to that of mining and quarrying, the impact of mining on the national accounts would be significantly higher. Mining and quarrying contribution to Gross Fixed Capital Formation (GFCF) remained unchanged at 11 percent in 2014. During the period under review, mining industry, excluding exploration, research and development organisations and head offices, employed 2.5 percent of South Africa's economically active population, Table 5.

FIGURE 4: PERCENTAGE CONTRIBUTION OF MINING AND QUARRYING TO GROSS DOMESTIC PRODUCT AND TOTAL FIXED CAPITAL FORMATION OF SOUTH AFRICA, 2005 – 2014 (CURRENT RAND PRICES)



Source: South African Reserve Bank: Quarterly Bulletin, June 2015

TABLE 3: CONTRIBUTION OF MINING AND QUARRYING TO GROSS DOMESTIC PRODUCT, FIXED CAPITAL FORMATION AND TOTAL NATIONAL EXPORTS OF GOODS, 2005 – 2014 (at current prices)

	CONTRIBUTION TO VALUE ADDED			CONTRIBUTION TO FIXED CAPITAL FORMATION			CONTRIBUTION TO NATIONAL TOTAL EXPORT OF GOODS		
Year	National Gross Domestic Product	From Mining		Total Fixed Capital Formation	From Mining		Total Exports	From Mining	
	R'million	R'million	%	R'million	R'million	%	R'million	R'million	%
2005	1 401 067*	105 992*	7.6	263 754*	16 743*	6.3	358 361*	102 486*	29.1
2006	1 572 319*	132 301*	8.4	324 083*	27 715*	8.6	447 690*	138 878*	31.8
2007	1 792 076*	156 970*	8.8	406 257*	40 206*	9.9	533 791*	161 755*	30.3
2008	2 033 207*	196 525*	9.7	520 717*	58 645*	11.3	704 293*	219 593*	30.8
2009	2 174 512*	196 521*	9.0	518 785*	64 140*	12.4	556 432*	176 390*	31.7
2010	2 494 860*	230 350*	9.2	529 431*	63 555*	12.0	668 856*	224 956*	33.6
2011	2 725 023*	262 391*	9.6	566 676*	68 819*	12.1	794 743*	282 012*	37.6
2012	2 939 643*	271 410*	9.2	614 505*	73 738*	12.0	825 025*	269 119*	32.6
2013	3 172 962*	284 802*	9.0	708 357	78 481	11.1	932 588*	291 548*	31.3
2014	3 404 493	286 606	8.4	769 230	86 962	11.3	1 003 826	279 104	27.8

Sources: *Department of Mineral Resources, Directorate Mineral Economics*
South African Reserve Bank, Quarterly Bulletin June 2014, pS106, 107 & 116
Notes ** Revised figures*

The total state revenue from the mining sector decreased significantly by 29.6 percent from R18.9 billion in 2013 to R13.3 billion in 2014. Iron ore was the largest contributor at 31.7 percent to the total state revenue, followed by chrome and platinum at 14.8 and 13.7 percent, respectively.

TABLE 4: CONTRIBUTIONS OF MINING AND QUARRYING TO STATE REVENUE, 2004–2014

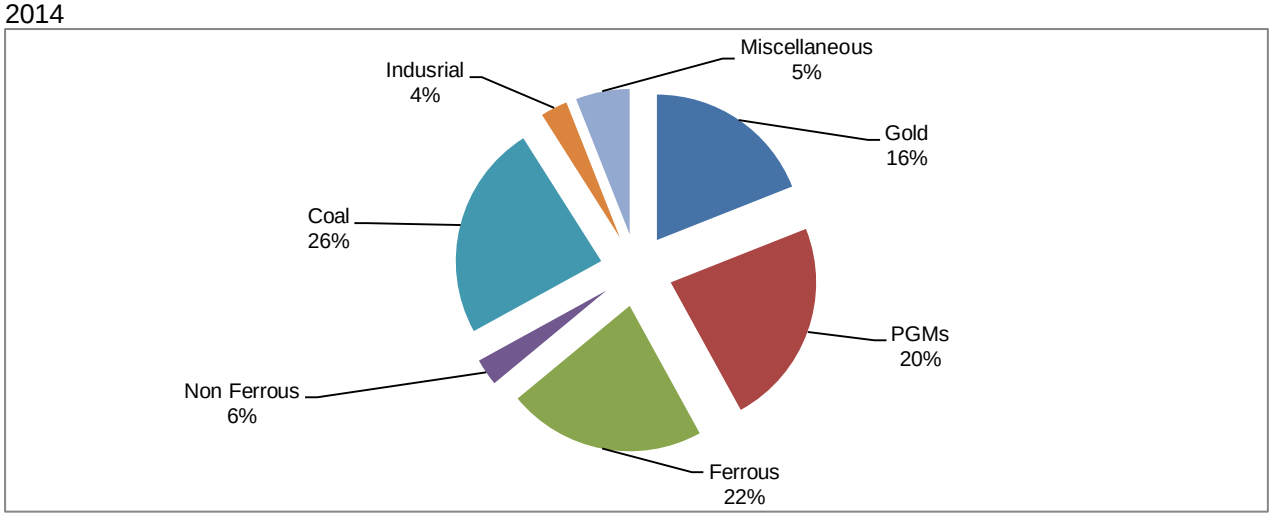
YEAR Ended 31 Mar	Mining Taxation	State Share of Profits and Diamond Exports Duties	Total State Revenue	As Percentage of Total State Revenue	State Aid#
	R' 000	R'000	R'000	%	R'000
2004	3 300 975	421 793	3 722 769	0,9	32 530
2005	8 765 364*	1 132 214*	9 897 579*	0,4	36 225
2006	16 760 280*	676 445*	17 436 726*	0,2	37 339
2007	19 897 914*	748 188*	20 646 103*	0,1	24 139
2008	33 394 165*	550 883*	33 945 048*	0,1	21 000
2009	14 004 838*	162 210*	14 167 048*	0,1	21 000
2010	16 921 875*	468 596*	17 390471*	0,1	18 000
2011	17 518 359*	802 061*	18 320 420*	0,1	18 000
2012	12 228 479*	575 234*	12 803 714*	N/A	N/A
2013	18 595 508	303 647	18 899 160	N/A	N/A
2014	13 153 568	164 052	13 317 620	N/A	N/A

Sources: *Department of Finance, South African Revenue Service*
Department of Mineral Resource, Directorate Financial Planning and Management Accounting
Notes: # *In respect of leased mines*
* *Revised figures*

MINERAL SALES IN 2014

The 2014 financial year was faced with challenges in terms of the sluggish global economic growth, SA's labour unrest and lower industrial economic growth in China, which impacted negatively on most commodity prices. Nevertheless, South Africa's total primary minerals sales value increased marginally by 0.1 percent from R395.4 billion in 2013 to R395.6 billion in 2014. The highest contributor to total sales revenue was coal at R105.7 billion followed by ferrous and PGMs at R77.5 billion and R88.7 billion respectively (Table 5). Despite the world's sluggish economic growth, the coal sector still maintained its position as SA's leading commodity revenue earner contributing 26.7 percent to the country's total minerals sales revenue (Figure 5). The sector's total sales revenue increased by 5.3 percent from R100.4 billion in 2013 to R105.7 billion in 2014. The increase in coal sales revenue can be attributed to strong local and international demand for the commodity particularly from Asia. Industrial and nonferrous also registered increase of 14.3 percent and 10.5 percent respectively. However, the 11.9 percent depreciation of the rand from R9.6923 in 2013 to R10.8449 in 2014 could not offset the poor performance in the gold sales which plummeted by 9.5 percent to R63.3 billion in 2014 from R70.1.8 billion in 2013.

FIGURE 5: CONTRIBUTION OF PRIMARY MINERAL COMMODITIES TO TOTAL SALES REVENUE, 2014



Source: Department of Mineral Resources, Directorate Mineral Economics

TABLE 5: MINERAL PRODUCTION AND SALES, 2014

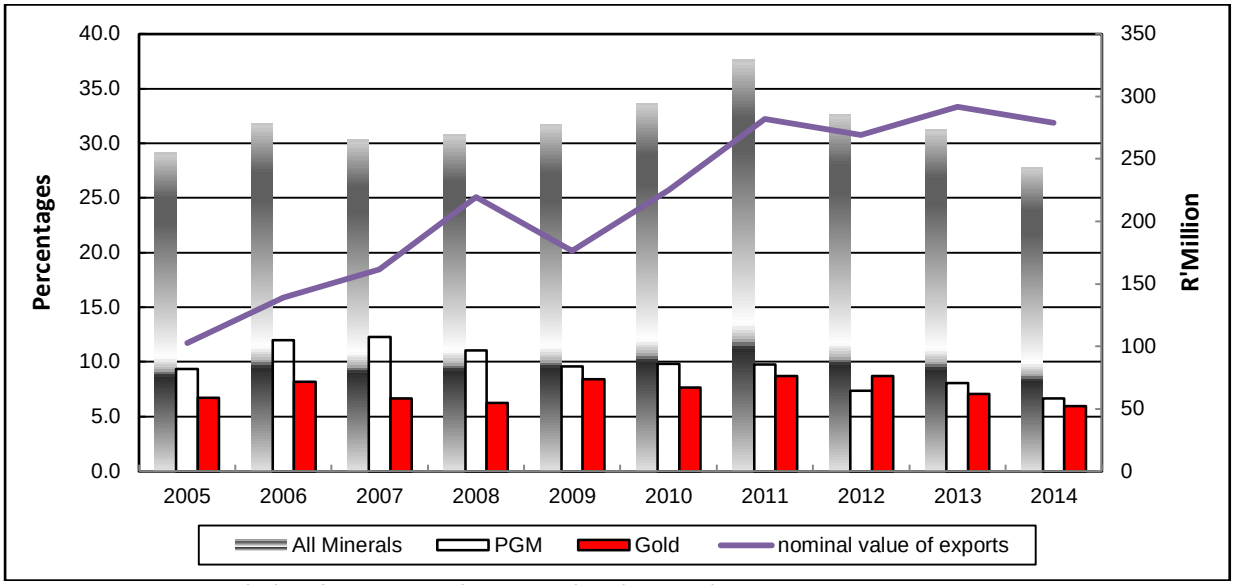
COMMODITY		PRODUCTION	LOCAL SALES (FOR)		EXPORT SALES (FOB)		TOTAL SALES	
		Quantity	Quantity	Value (R)	Quantity	Value (R)	Quantity	Value (R)
1. Precious								
Diamonds	ct	8 046 050	**	**	**	**	**	**
Gold	kg	149 634	8 344	3 419 370 908	136 047	59 898 124 722	144 391	63 317 495 630
Platinum-group metals	kg	188 444	**	10 640 749 311	201 780	66 860 760	**	77 501 509 742
Silver	kg	37 268	4 267	27 010 528	55 058	315 096 839	59 325	342 107 367
2. Semi-precious stones			*	*	*	*	*	*
3. Ferrous[@]	t	108 848 300	*	15 157 638 732	75 302 425	73 526 739 191	*	88 684 377 923
4. Non-ferrous[+@]	t	160 609	53 179	4 931 646 904	151 673	11 584 062 829	204 852	16 515 709 733
5. Energy								
Coal	t	260 642	182 706 270	54 828 632 766	75 426 562	50 881 592 387	258 132 832	105 710 225 153
Uranium oxide	kg	667 697	**	**	**	**	**	**
6. Industrial[@]				12 544 659 176		2 137 973 315		14 682 632 491
7. Miscellaneous				11 951 059 666		8 243 444 869		20 194 504 535
TOTAL#				116 573 945 988		279 074 445 293		395 648 391 281

Source: Department of Mineral Resources, Directorate Mineral Economics
Notes: All quantities are in metric tons, unless otherwise specified
***Not available: where applicable, earnings are included under 'Miscellaneous'*
[@] Full details given in respective overview chapters
[+] Excludes titanium and zirconium minerals which are included under Miscellaneous'
** Nil*

Total local mineral sales value increased by 11 percent from R104.8 billion in 2013 to R116.6 billion in 2014 (Table 5), due to the improved local sales prices in most commodities. In 2014, coal remained the major local earner at R54.9 billion from R49.4 billion in 2013, representing an increase of 10.9 percent. All the ferrous minerals performed well with chrome registering the highest increase of 32.4 percent followed by manganese and iron ore at 9.2 percent and 0.3 percent, respectively. PGMs local sales revenue also followed the same trend increasing by 19.7 percent to R10.6 billion in 2014 from R8.9 billion in 2013. During the same period, gold sector declined by 18.4 percent.

South Africa's mineral export sales revenue decreased by 4 percent from R291.5 billion in 2013 to R279.1 billion in 2014. The decrease can be attributed to the weak global economy, depressed commodity prices as well as production decrease in some commodities. The primary minerals export sales percentage contribution to the country's total exports value of goods also decreased from 31 to 28 (Figure 6 and Table 6). During the period under review, positive performance from the nonferrous minerals was led by a 40 percent increase in copper export mass from 26 239 tons in 2013 to 36 685 tons in 2014, followed by titanium and nickel at 23 percent and 19 percent, respectively. Manganese and iron ore also followed the same trend registering increase of 21 percent and 7 percent respectively. The increase in sales mass of these commodities led to an increase in combined export sales revenue which helped to limit the decrease in sales revenue to 4 percent. The weakening rand against dollar also boosted sales revenue in rand terms. On the other hand, the negative effect of the weaker commodity prices and demand of mineral commodities was evident in the antimony export mass and sales revenue which was hardest hit at 67 percent and 65 percent, respectively. PGMs sales revenue also declined by 11 percent followed by gold and iron ore both decreasing by 8 percent.

FIGURE 6: CONTRIBUTION OF PRIMARY MINERALS TO SOUTH AFRICA'S EXPORTS[#,] 2005-2014



Sources: Department of Mineral Resources, Directorate Mineral Economics
Notes: [+] Includes gold
[#]Total exports of goods only, including gold

TABLE 6: SOUTH AFRICA'S PRIMARY MINERAL SALES BY PROVINCE, 2014

PROVINCE	LOCAL SALES (FOR)		EXPORT SALES (FOB)		TOTAL SALES	
Mpumalanga	47 631 399	40,6	66 754 735	23,9	114 386 134	28,8
North West	12 873 648	11,0	50 753 696	18,2	63 627 344	16,0
Northern Cape	12 148 823	10,3	62 411 055	22,4	74 559 878	18,8
Limpopo	20 716 527	17,6	42 550 928	17,6	63 267 455	16,0
Gauteng	6 108 533	5,2	33 692 384	12,1	39 800 917	10,0
Free State	5 361 002	4,6	14 946 941	5,4	20 307 943	5,1
KwaZulu-Natal	5 697 075	4,9	5 211 203	1,9	10 908 278	2,8
Western Cape[#]	6 159 620	5,2	2 782 597	1,0	8 942 217	2,3
Eastern Cape	699 829	0,6	0	0.0	699 829	0,2
TOTAL[#]	117 396 456	100,0	279 103 539	100,0	396 499 995	100,0

Source: Department of Mineral Resources, Directorate Mineral Economics
Note: [#] Hydrocarbons were produced and sold at a value of R1 070 million locally

During the period under review, the bulk of the total mineral revenues were generated from Mpumalanga, North West, Northern Cape, Limpopo and Gauteng provinces collectively accounting for 84,7 percent of the total primary mineral sales revenue (Table 6). Mpumalanga remained the leading contributor to both local and export sales revenue with 40.6 percent and 23.9 percent respectively. In 2014, Northern Cape remained the second largest contributor to export and total sales revenue at 22.4 percent and 18.8 percent, respectively. Mpumalanga is mainly dependent on coal as a major contributor towards minerals revenue; North West depends on PGMs, Northern Cape on diamonds, Limpopo on PGMs, diamonds, copper as well as coal and Gauteng on gold.

SELECTED PROCESSED MINERAL SALES

Total sales revenue of the selected processed minerals increased by 18.1 percent from R66.7 billion in 2013 to R78.8 billion in 2014, with local and export sales increasing by 24.8 percent and 16.8 percent,

respectively (Table 7). The major contributors to the total of selected processed minerals sales were chromium alloys at 45.9 percent, followed by a conglomerate of classified commodities at 40.2 percent.

TABLE 7: SOUTH AFRICA'S PRODUCTION, LOCAL AND EXPORT SALES OF SELECTED PROCESSED MINERAL PRODUCTS, 2014

COMMODITY	PRODUCTION	LOCAL SALES		EXPORT SALES		TOTAL SALES	
		Mass	Value (FOR)	Mass	Value (FOB)	Mass	Value (FOB)
	T	T	R'000	T	R'000	T	R'000
Chromium alloys	3 719 010	571 341	5 105 685	3 192 039	31 079 849	373 353	36 185 534
Manganese alloys	969 521	104 371	1 020 762	658 551	6 334 636	762 922	7 355 398
Vanadium+	21 583	2 038	381 398	13 680	3 173 953	15 718	3 555 351
Other: Classified	3 019 985	503 470	6 868 512	2 297 093	24 812 585	2 321 098	31 681 097
TOTAL 2014	7 730 099	1 181 220	13 376 357	6 161 363	65 401 023	7 342 583	78 777 380
TOTAL 2013	6 507 753	903 372	10 715 989	5 256 135	56 001 719	6 159 507	66 717 708

Sources: Department of Mineral Resources, Directorate Mineral Economics
: United State Geological Survey
Notes : [+] Contained vanadium
[x] Comprises aluminium, titanium slag, zinc metal, low-manganese pig iron, silicon alloys and metal, phosphoric acid, and antimony trioxide

KwaZulu-Natal (KZN) province was the major contributor to the total selected processed mineral sales accounting for 35.4 percent, followed by Mpumalanga and North West provinces at 34.3 percent and 20.5 percent respectively, (Table 8). Collectively, KwaZulu-Natal, Mpumalanga and North West provinces accounted for 92.2 percent of the total processed minerals sales revenue. Titanium slag and aluminium dominated the KwaZulu-Natal contribution, whilst 95 percent of Mpumalanga's total selected processed mineral sales revenue was derived from ferro alloys. The total processed mineral sales revenue of the North West was nearly totally derived from chromium which contributed 85.8 percent. Three provinces together dominated both the local and export sales revenue, with a collective contribution of 92,1 percent and 89,9 percent, respectively.

TABLE 8: SOUTH AFRICA'S LOCAL AND EXPORT SALES OF SELECTED PROCESSED MINERAL PRODUCTS BY PROVINCE, 2014

PROVINCE	LOCAL SALES (FOR)		EXPORT SALES (FOB)		TOTAL SALES	
	R'000	%	R'000	%	R'000	%
KwaZulu-Natal	5 981 182	44.7	21 934 435	33.5	27 915 617	35.4
Mpumalanga	5 115 378	38.2	21 939 878	33.5	27 055 255	34.3
North West	1 226 151	9.2	14 942 411	22.8	16 168 562	20.5
Gauteng	921 718	6.9	3 577 056	5.5	4 498 774	5.7
Western Cape	88 543	0.7	1 823 331	2.8	1 911 874	2.4
Limpopo	43 386	0.3	1 183 913	1.8	1 227 299	1.6
TOTAL	13 376 357	100.0	65 407 023	100.0	78 777 380	100.0

Source: Department of Minerals Resources, Directorate Mineral Economics

TOTAL EMPLOYMENT IN 2014

In 2014, South Africa's labour market was characterised by disruptive labour unrest particularly in the mining industry's PGMs sector that lasted from January to June 2014. SA's total mining employment decreased by 14 322 workers or 2 percent to 495 592 in 2014 from 509 914 in 2013, mainly due to the retrenchments in the gold and PGMs sectors as a result of industrial actions and lower commodity prices. During the same period remuneration in the mining sector increased by 7.7 percent from R 100.75 billion in 2013 to R 102.18 billion in 2014 (Table 9). However, for the past decade, 2004-2013, a total of 51 460 direct jobs were created, highlighting the significance of mining to the South African economy.

TABLE 9: EMPLOYMENT AND WAGES IN SOUTH AFRICA'S MINING INDUSTRY, 2005–2014

YEAR	EMPLOYMENT		WAGES				
	Number employed	As % of total economically active population	Total		Per worker per annum		As % of total mining revenue[#]
			Nominal	Real[+]	Nominal	Real[+]	
			R million		R	R	
2005	444 132*	2,6	36 682	36 703	86 299*	90 305*	25,6
2006	456 337*	2,7	39 447	41 756	92 578*	99 149*	20,3
2007	495 150*	2,9	50 072	49 924	100 826*	100 527*	22,4
2008	518 519*	2,9	60 876	65 193	125 730*	134 647*	20,3
2009	492 219*	2,9	66 096	68 935	140 049*	146 064*	27,4
2010	498 906*	2,9	74 318	78 044	156 430*	164 273*	24,7
2011	512 878*	2,9	86 972	91 866	179 118*	189 196*	23,5
2012	524 632*	2,9	93 608	78 120	148 904*	124 267*	25,7
2013	509 914*	2,5	100 753	106 892	209 627*	222 399*	25,5
2014	495 592	2,5	102 184	102 184	206 186	206 186	25,8

Sources: *Quarterly Labour Force Survey (Stats SA), May 2014*
Department of Mineral Resource, Directorate Mineral Economist

Notes: [#] *Export plus local commodity sales*
[+] *Deflated by means of the CPI with 2008 as base year*
** Revised figures*

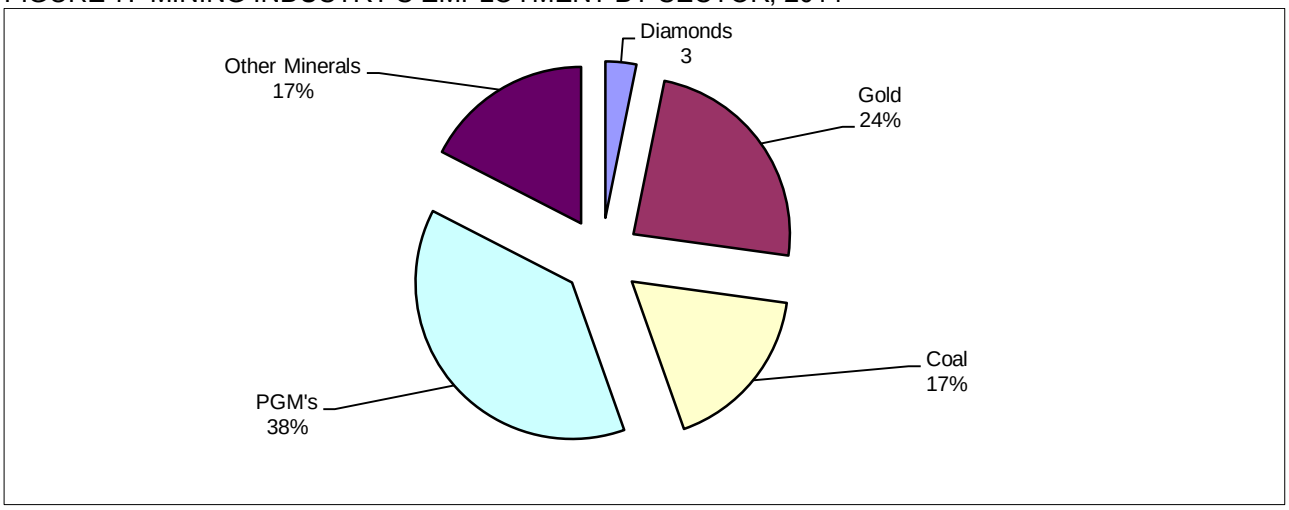
TABLE 10: EMPLOYMENT AND REMUNERATION BY PROVINCE, 2014

PROVINCE	EMPLOYEES		TOTAL REMUNERATION	
	Number	%	R million	%
North West	161 885	32,7	29 328	28,7
Mpumalanga	102 933	20,8	24 637	22,6
Gauteng	63 916	12,9	13 077	12,8
Limpopo	75 458	15,2	15 460	15,1
Free State	35 070	7,1	7 049	6,9
Northern Cape	39 275	7,9	9 536	9,3
KwaZulu-Natal	11 927	2,4	2 246	2,2
Western Cape	3 380	0,7	657	0,6
Eastern Cape	1 748	0,4	194	0,2
TOTAL	495 592	100,0	102 184	100,0

Source: *Department of Mineral Resources, Directorate Mineral Economics*

In 2014, North West, platinum province remained the largest contributor to total mining employment and remuneration at 33 percent and 28 percent respectively. This is despite the industrial action that took place in the province. Provincial employment distribution was distinctly unequal with five provinces (North West, Mpumalanga, Gauteng, Limpopo and the Free State) employing 93.2 percent of the mining workforce, which in turn earned 86.1 percent of the total remuneration (Table 10).

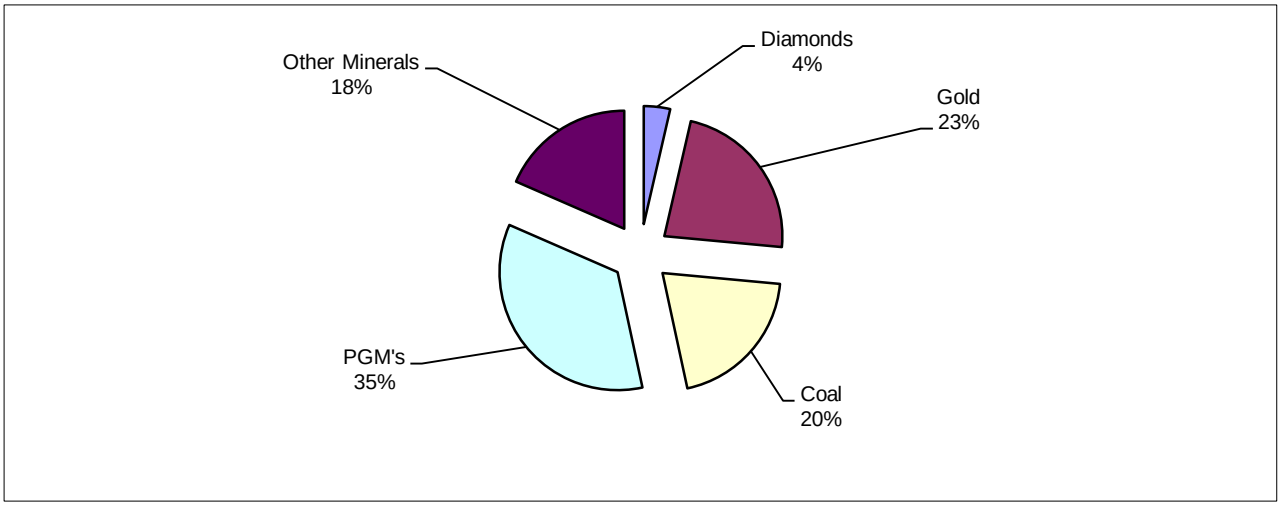
FIGURE 7: MINING INDUSTRY'S EMPLOYMENT BY SECTOR, 2014



Source: Department of Mineral Resources, Directorate Mineral Economics

Figure 7 above indicates that PGMs sector remained the largest contributor to SA's total mining industry's employment at 38 percent, a decrease of 2 percent to 188 152 from 191 261 in 2013. In addition employment levels in the gold and coal sectors also declined by 10 percent and 2 percent, respectively. However, diamond sector recorded an increase of 16 percent from 13 579 in 2013 to 15 795 in 2014. Nevertheless, gold sector maintained their positions as the second and third largest contributor to total mining employment at 24 percent and 17 percent respectively.

FIGURE 8: MINING INDUSTRY'S REMUNERATION BY SECTOR, 2014



Source: Department of Mineral Resources, Directorate Mineral Economics

South Africa's mining sector's remuneration increased marginally by 1 percent from R100.8 billion in 2013 to R102.2 billion in 2014. In 2014, PGMs industry accounted for 35 percent of the total remuneration down from 37 percent in 2013, followed by gold and coal industry which accounted for 23 percent and 20 percent, respectively (Figure 8).

SOUTH AFRICA'S IMPORTS OF SELECTED PRIMARY AND PROCESSED MINERAL PRODUCTS, 2014

South Africa is well able to supply for its minerals demand, however, there are some minerals and mineral products, which still need to be imported due to lack of local resources. The total value of imports increased by 37.4 percent from R16.9 billion in 2013 to R29.9 billion in 2014 (Table 11). In order to reduce the increase in imports, South Africa will need to strengthen beneficiation and develop projects that will produce products locally and substitute imported goods.

The value of imports of precious metals increased by 20.3 percent from R3.1 billion in 2013 to R3.7 billion in 2014, with diamonds also increasing by 32.7 percent. During the same period coking coal increased by a significant 224.6 percent whereas processed and primary industrial minerals sales value decreased by 80.6 percent and 3.2 percent respectively.

TABLE 11: SOUTH AFRICA'S IMPORTS OF SELECTED PRIMARY AND PROCESSED MINERAL PRODUCTS, 2014

PRODUCT	VALUE (FOB)		
	2013 R'000	2014 R'000	Year on year % change
Precious			
Diamonds	1 364 863	1 811 819	32.7
Other precious and semi-precious stones *	276 548	316 689	14.5
Precious metals +	3 062 894	3 684 846	20.3
Ferrous@			
Primary	696 639	778 449	11.7
Processed	1 380 038	1 550 269	12.3
Nonferrous@	145 512	151 767	39.5
Coking Coal	2 839 238	9 216 772	224.6
Industrial@			
Primary	1 584 862	1 534 706	-3.2
Processed	1 988 923	386 463	-80.6
Manufactured	8 931 692	9 711 291	8.7
TOTAL#	16 873 550	29 994 045	37.4

Source: South African Revenue Service, 2014

Notes: * *Includes natural and synthetic precious or semi-precious stones and dust and powders of these stones*
+ *Includes alloys containing base metals*
@ *Full details given in relevant chapters*

REPORTED MINERAL-RELATED PROJECTS IN SOUTH AFRICA

The newly committed investment in mineral related projects in South Africa amounted to R363.3 billion in 2014 of which 99.8 percent was for primary minerals and merely 0.2 percent recorded for processed mineral products (Table 12). Of the three major commodities, coal projects led the primary minerals, accounting for 24.5 percent followed by platinum and gold with 22.3 and 10.5 percent respectively.

TABLE 12: NEWLY COMMITTED MINERAL-RELATED PROJECTS IN SOUTH AFRICA, 2014

SECTOR	New mine project COST	Mine Expansion project COST	TOTAL COST	AS A PERCENTAGE OF PRIMARY MINERALS	AS A PERCENTAGE OF TOTAL COST
	R billion	R billion	R billion		
Primary	211.7	150.9	362.6	100	99.8
Gold	12.0	26.0	38.0	10.5	10.5
Platinum	21.7	59.2	80.9	22.3	22.3
Coal	63.0	26.1	89.1	24.6	24.5
Other	115.0	39.6	154.6	42.6	42.5
Processed minerals	0.5	0.3	0.8		0.2
TOTAL	212.17	151. 15	363.32		100

Source: Department of Minerals Resources, Directorate Mineral Economics
Mining Weekly

SADC MINING AND MINERAL PRODUCTION OF SELECTED MAJOR MINERALS

The Southern African Development Community (SADC) countries continue to be major contributors to the world's mining and mineral production. During the period under review, platinum production registered an increase of 4.4 percent from 142 800kg in 2012 to 149 400kg in 2013 accounting for 80.3 percent of world production (Table 13). Production of chromite and copper also registered increases of 19.4 and 19.3 percent, and accounted for 48.0 and 9.9 percent of the global production, respectively. However, lead production, which contributed 0.9 percent to the world production, recorded the highest decrease of 14.1 percent from 61 500t in 2012 to 52 800t in 2013, followed by zinc and diamonds at 5.2 and 4.4 percent, which accounted for 1.6 and 52.4 percent of world production, respectively.

TABLE 13: SADC MINE PRODUCTION OF SELECTED MAJOR MINERALS, 2009 – 2013

MINERAL	PRODUCTION						
	unit	2009	2010	2011	2012	2013	% of world production
Coal	t	255 863 000	260 448 000	256 755 000	258 575 793	256 282 136	3.3 %
Cobalt	t	27 738	56 840	58 540	9 764	6 494	52.9 %
Copper	t	1 046 900	1 254 400	1 371 500	1 525 800	1 823 600	9.9 %
Chromite	t	10 742 600	11 340 000	11 411 400	11 549 900	14 126 300	48.0 %
Diamonds	carats	57 807 117	69 574 658	67 551 925	71 782 664	58 655 986	52.4 %
Gold	kg	266 344	272 600	239 500	236 000	159 724	6.9 %
Platinum	kg	148 000	156 500	158 400	143 300	137 024	80.3 %
Nickel	t	80 530	71 700	68 900	71 600	110 200	4.4 %
Lead	t	60 000	63 000	62 500	59 200	52 800	0.9 %
Zinc	t	233 000	241 000	238 200	230 400	223 700	1.6 %

Source: Department of Minerals Resources, Directorate Mineral Economics
World Bureau of Metal Statistics
**RSA Figure (other SADC countries figures not available)*
 # 2014 figures not available

MINERAL BENEFICIATION

Beneficiation remains a key programme for the Department of Mineral Resources as it seeks to leverage the country's comparative advantage in mineral resource endowment to create a competitive advantage for domestic mineral beneficiating entities thus playing a contributory role towards setting the country's growth trajectory on a production led growth path.

To this end, the Department has put in place the policy building blocks to ensure security of raw material supply by strengthening the provisions of section 26 as was planned in the beneficiation strategy. The strategy, which was adopted as policy by Government in 2011, had identified limited access to raw materials as one of the five key constrains to domestic mineral beneficiation and proposed as an intervention, strengthening of the Minerals and Petroleum Resources Development Act to ensure security of supply for domestic beneficiation.

Section 26 of the Mineral and Petroleum Resources Amendment Bill of 2014, ensures security of supply by:

- Enabling the Minister, after consultation with stakeholders, to designate identified minerals as being critical for domestic beneficiation.
- Compelling producers of designated minerals to set aside a predetermined percentage of their production for local beneficiation.
- Ensuring designated minerals are accessed at competitive prices through a provision that requires producers to sell the portion of designated minerals at mine gate price or an agreed price between the producer and beneficiator.
- Ensuring local demand for designated minerals is satisfied through section 26(3) which requires all exports of designated minerals to have written approval except exports done by producers who have complied with section 26.

Platinum is one of the rarest of the precious metals – keeping its natural white colour forever, making it to stand out to the consumers who require its elegance and distinctive nature. Being one of the rarest precious metals and fortunately the country holds over 80% of the world's known platinum resources and reserves. That will always remain an inherent advantage to the country and might not remain so forever with South Africa losing its ground to the other producers. It's time that as a country we assume a role in

shaping the market as we once did and that will require commitment from both government and the industry, hence the department is taking a serious role in unlocking this value chain.

It's only fitting that South Africa promotes the innovation and technical competence in the design and beneficiation of platinum, including platinum jewelry. This can be realised through the identification, understanding and development of global competitiveness, while expanding the global outlook of entrants in countries such as India and China.

This initiative by industry is greatly appreciated as it's important that the skills within the country are enhanced and nurtured to build an industry that can compete at a global level. To succeed the country needs to define its core and competitive competency that can compete and create partnerships at a global scale. The abroad markets are very loyal to their own brands and to gain entry into those we need to possess high craftsmanship that will make our products to stand out and be desired by many.

As part of unlocking skills component government together with industry needs to ensure that young students are attracted into the field and be afforded opportunities that were not previously available to them especially the manufacturing of jewelry using platinum. The Government is certain about developing this value chain hence the initiative by the Mining Qualifications Authority (MQA) to develop a new all-rounder entrepreneurial jeweler curriculum which is in progress.

The local jewelry industry together with government should stimulate market demand in platinum jewelry especially in the country, as this will help to grow both local skills and job creation in the country. There can be no denying that South Africa's beneficiation industry needs to be developed to create much-needed jobs.

Therefore, the development of the platinum downstream value chain sector in South Africa, as advocated by the legislation, has an immense economic potential, as it will stimulate business development in the platinum industry and related industries, which offers a real opportunity to achieve sustainable socio-economic development and reduce poverty.

Platinum jewelry should become the sought after metal for bridal jewelry not only the Indian market but across the board. South African local jewelers should focus on growing markets in China and India as the demand for platinum jewelry is growing fast in these countries. In India the estimated bridal jewelry share is 60% of its jewelry market, 11 million wedding were estimated for 2015 and retail sales of platinum jewelry grew by 41% in 2013. India's platinum jewelry sales grew by estimated 15% and gold jewelry grew by 11% in 2013, thus platinum jewelry is fast becoming the game changer in the global jewelry industry.

Minerals and Metals Prices 2014

Mining stocks and metals fell in 2014 as a result of concerns over weak Chinese demand and rising supply return following a rebound in prices at the start of the year (Table 14). The price of copper which snapped its longest losing run in two years is expected to decline further in 2016. The selloff in mining stocks is the direct result of base metals being under pressure. In 2014, metal prices plunged. Scores of mines were put into 'care and maintenance', thousands of mining employees were retrenched, investment and government revenues decreased. For economies dependent on the metals sector, the contraction presents major development challenges. One side-effect of the global decline in metal prices is that it has put a group of lesser known 'Neglected Development Minerals' into the spotlight. Industrial minerals, construction materials, dimension stones, and semi-precious stones are mostly mined for domestic economic purposes and they respond to local, national and regional economic drivers, rather than international commodity markets. In comparison to the metals sector, Neglected Development Minerals have closer links with the local economy, and have the potential to generate more local jobs, with a greater potential to reduce poverty. This is partly because the sector is dominated by small and medium scale domestic businesses servicing local markets.

While oil prices have seen the most dramatic decline, other commodities have also been gradually weakening in recent months. And this broad-based weakness is expected to continue throughout 2015, before beginning a modest turn around in 2016.

In addition, three industrial commodity price indices – energy, metals and minerals, and agricultural raw materials experienced near identical declines between early 2011 and the end of 2014, of more than 35 percent each, and will continue to contract this year. Prices of precious metals are also expected to decline

by 3 percent in 2015, on top of the 12 percent decline seen in 2014. Again, ample supplies, weak demand, and a strengthening U.S. dollar have weighed on prices of these commodities as well.

Lower commodity prices are weighing heavily on most minerals producing countries including South Africa and dampening -revenue growth. Although growth remains strong among emerging markets like China, demand for mineral products has moderated, and is unlikely to pick up soon. The prices of largest sources of foreign earnings in most minerals producing regions therefore remain depressed. Commodity prices declined in 2014, largely because of slower demand from emerging markets, particularly China, which accounts for more than 40% of world demand for base -metals. Demand from India and China will support coal prices. Iron ore prices are expected to stabilize as a result of expansion by Australian and Brazilian companies, which will increase global supply.

In the face of declining prices, sustainable development in mining will only be achieved through continuous exploration, technological innovation, and environmental rehabilitation. The exhaustion of known mineral deposits and the accelerated degradation of the environment necessitate the allocation of more resources to exploration, research into applicable technology, and rehabilitation. Increased investment in these activities might cause mineral prices to rise and thus reverse the long-term trend of declining and stagnating mineral prices. Present mineral price structures raise the question whether the environment is adequately priced by the free market. Market imperfections which do not properly reflect the cost to the environment have created exhaustible resources price levels lower than the socially optimal. Mineral producers of the developing world are unable to sustain mining development in the face of declining mineral price trends. If the inhabitants of the industrialized countries are concerned about global environmental degradation, they should be willing to pay mineral prices which internalize environmental costs.

Gold: The estimated gold price in 2014 was 10.3 per cent lower than the price in 2013. This is the first time the annual average gold price has decreased two years in a row since 2001.The annual average price of gold was $1,266.21 per troy ounce, the lowest level since 2011. The price which peaked at $ 1669.59 per troy ounce in 2012 trended downward until the price reached a low of $1,266.21 per troy ounce in 2014. Many believe that the gold price decreased owing to the lack of confidence in gold as an investment. Throughout the world, high-cost mines, expansion projects, and development projects were placed on hold because of the drop in the price of gold.

PGM's: Owing to continued global economic concerns, most platinum group metals recorded modest movements in their annual average prices. The prices of platinum averaged $1384.57 per troy ounce, down from$1487.02 per troy ounce recorded in 2013. The average price for palladium was $802.47 per troy ounce in 2014, which was the highest since 2010. Rhodium averaged $1171.43 per ounce up from 2013 average of $1065.07 per troy ounce, but still very short of $2458.43 per troy ounce recorded in 2010. The palladium average yearly price was higher in 2014 than that in 2013, likely owing to increased consumption in the automobile sector. Platinum prices remained higher than those for rhodium and gold in 2013 and 2014. The industrial strike in the platinum mining sector in South Africa in 2014 resulted in production losses, but above stock more than made up for the losses and suppressed any upward price movement. Owing to increased costs and lower metal prices, several mines are being placed on care-and-maintenance status. In an effort to return to profitability, most leading PGM producers are planning to restructure their operations by consolidating mines, closing unprofitable mines, which could result in thousands job losses.

Silver: In 2014 the price of silver averaged $19.08 per troy ounce, the lowest since 2010, and 19.7% lower than the average of 2013. The overall decline in silver prices corresponded to a drop in industrial consumption owing to a depressed global economic environment. Investment demand for silver continued to increase as investors sought safe-haven investments. Demand for silver in jewellery, electronic applications, and other industrial applications declined, while the use of silver in brazing alloys, coins, and solders increased. Silver demand for silverware remained unchanged.

Copper: The London Metal Exchange spot copper price in 2014 averaged $6859.69 per ton down from the 2013 average of $7335.84 per ton. Copper prices on average trended downward during the year in large part owing to slower economic growth in China and expectations that the U.S. Federal Reserve would begin cutting its bond purchases during 2013. Global production of refined copper was projected to increase by 3.9% and consumption was projected to remain essentially unchanged, a scene that does not particularly support price increase.

Manganese: Manganese ore containing 48 -50% manganese traded at $5.42/mtu in 2014, same as the 2013 price, but lower than the 2010 price of $7.71/mtu.

Coal: Steam coal local price for 2014 averaged R285.94 up from up from R260.43 recorded in 2013. Export coal (FOB) changed hands at an annual average of R692.74 per ton, up from R689.73 recorded in 2013.

Thermal coal prices at the world's biggest export hub in Newcastle, Australia, have tumbled this year. It is estimated that a quarter of Australia's thermal coal mines are now becoming unprofitable. Over the short-term, traders of seaborne coal are concerned that the expected restocking which normally takes place in the major consuming bloc of China, Japan, India, Korea, the European Union and Taiwan has so far failed to materialize. This will further push the prices down. The major concern weighing on mining companies and investors is whether China is approaching a point of peak coal consumption. According to the Paris-based International Energy Agency: "For decades, Chinese coal consumption has known only one direction: upwards. During the past 30 years, annual coal use in China decreased only twice, most recently in 1997. Given the orientation of Chinese policy to diversify the power system beyond coal and the big emphasis on air quality, the question is whether the trend will stop soon, resulting in a peak in coal demand." However, given the ongoing scale of expansion in the Chinese economy and the expected increasing demand for power from its burgeoning middle class, it will be difficult for Beijing to significantly cut coal's share of the country's energy mix in the near future.

Sustainable development in mining will only be achieved can be achieved through continuous exploration, technological innovation, and environmental rehabilitation. The exhaustion of k Sustainable development in mining can be achieved only through continuous exploration, technological innovation, and environmental rehabilitation. The exhaustion of known mineral deposits and the accelerated degradation of the environment necessitate the allocation of more resources to exploration, research into applicable technology, and rehabilitation. Increased investment in these activities might cause mineral prices to rise and thus reverse the long-term trend of declining and stagnating mineral prices. Present mineral price structures raise the question whether the environment is adequately priced by the free market. Market imperfections which do not properly reflect the cost to the environment have created exhaustible resources price levels lower than the socially optimal. Mineral producers of the developing world (the South) are unable to sustain mining development in the face of declining mineral price trends. If the inhabitants of the industrialized countries (the North) are concerned about global environmental degradation, they should be willing to pay mineral prices which internalize environmental costs. Known mineral deposits and the accelerated degradation of the environment necessitate the allocation of more resources to exploration, research into applicable technology, and rehabilitation. Increased investment in these activities might cause mineral prices to rise and thus reverse the long-term trend of declining and stagnating mineral prices. Present mineral price structures raise the question whether the environment is adequately priced by the free market. Market imperfections which do not properly reflect the cost to the environment have created exhaustible resources price levels lower than the socially optimal. Mineral producers of the developing world are unable to sustain mining development in the face of declining mineral price trends. If the inhabitants of the industrialized countries are concerned about global environmental degradation, they should be willing to pay mineral prices which internalize environmental costs.

TABLE 14: METALS/MINERALS PRICES (2010- 2014)

COMMODITY	UNIT					
		2010	2011	2012	2013	2014
Aluminium High Grade, LME Cash	$/t	2173.19	2383.20	2023.52	1849.25	1865.87
Antimony, Metal Bulletin Free Market	$/t	9020.27	14741.44	12778.05	10347.67	9446.58
Cadmium, Metal Bulletin Free Market	$/lb,	193.50	139.35	90.58	96.06	87.83
Coal[+] - Steam: Local FOR	R/t	177.70	196.14	222.17	260.43	285.94
Export FOB	R/t	549.90	727.85	684.91	689.73	692.74
Anthracite: Local FOR	R/t	776.40	898.90	953.75	932.38	970.41
Export FOB	R/t	770.40	864.65	945.47	867.11	775.93
Cobalt, Metal Bulletin Free Market	$/lb,	20.57	17.58	13.97	13.17	14.40
Copper: Grade A, LME Cash	$/t	7533.92	8832.89	7957.31	7335.84	6859.69
Republic Copper Price	R/t	62068.20	72610.50	73057.35	79868.94	85338.86
Ferrochrome: Charge 52% Cr*	$/lb, Cr	1.24	1.26	1.21	1.16	1.18
Ferromanganese: High Carbon 7,5% C*	€/t	1091.52	993.14	907.58	775.52	746.68
Ferrovanadium 70-80% V*	$/kg V	29.99	28.76	24.99	27.66	25.51
Gold, London Price	$/ozt	1225.05	1569.07	1669.59	1410.91	1266.21
Ilmenite Concentrate 54% TiO_2	A$/t	74.31	128.38	276.93	291.38	195.22
Lead, LME Cash	$/t	2144.44	2397.52	2064.25	2141.14	2095.67
Lithium Ore: Petalite 4%	$/t	212.50	212.50	212.50	212.50	214.98
Manganese Ore: 48-50% Metalurgical*	$/mtu	7.71	6.07	4.92	5.42	4.52
Molybdenum: Molybdic Oxide*	$/lb. Mo	15.84	15.78	12.79	10.40	11.70
Nickel, LME Cash	$/t	21803.81	22938.74	17577.39	15018.27	16864.58
Palladium, London Price	$/ozt	526.32	731.02	646.72	724.99	802.47
Platinum, London Price	$/ozt	1610.89	1718.63	1554.33	1487.02	1384.57
Rhodium, Johnson Matthey Base Price	$/ozt	2458.43	2025.04	1275.73	1065.07	1171.43
Rutile Concentrate 95% TiO_2	A$/t	756.68	1032.34	2369.85	1681.93	1012.97
Silver, London Price	$/ozt	20.16	35.34	31.24	23.76	19.08
Tantalum Ore: 30% Ta_2O_5	$/lb,	0.00	0.00	0.00	0.00	0.00
Tin, LME Cash	$/t	20405.83	26181.78	21060.80	22370.00	21916.14
Uranium Oxide, NUEXCO spot	$/lb,	45.87	56.30	48.96	27.04	0.00
Vanadium Pentoxide*	$/lb,	6.92	6.61	5.59	6.00	5.45
Zinc, Special High Grade	$/t	2160.71	2194.36	1952.98	1912.33	2162.00
Zircon: Foundry Grade, Bulk, FOB	A$/t	839.35	1671.19	2489.68	1514.58	1124.09

ECONOMIC OUTLOOK FOR THE SOUTH AFRICAN MINERALS INDUSTRY 2013/2014

2014 was another dismal year for commodities. Economic challenges and an imbalance of supply and demand have had a devastating impact, leaving the industry with a cautious outlook for the future. However, the cyclical nature of the industry means that mining companies are no strangers to ups and downs in the global market. In the current economic environment, the industry is focused on reducing costs, improving productivity and preparing for the next upswing. The most worrying spot in the South African mining industry is the threat of losing employment. The industry employed 495 592 people in 2014 compared with 524 632 and 509 914 employed in 2012 and 2013 respectively. The prices of most commodities deteriorated due to uncertainty over short-term global economic outlook, particularly the

softening of China's growth in 2014 and volatility is expected to persist in 2015 and beyond. Despite these challenges, there are strong sentiments that the industry's economic prospects over the long-term remain strong, especially as the middle classes of China, India and other emerging nations continue to grow. Opening the industry to new and growing markets for South African minerals and metals is crucial for the industry to thrive.

As expected, production performance for most minerals, especially platinum and gold was downcast due to an unprecedented five-month strike by platinum mine workers, followed by another prolonged strike by more than 220 000 metalworkers and engineers. Troubles in the mining sector were also reflected in the country's broader economic performance. The Gross Domestic Product (GDP) of 1.5 per cent in 2014 was the lowest for South Africa in five years. Rolling electricity blackouts due to load shedding as the power utility struggles to keep up with demand have also shaken business confidence. Comments on the state of mining in South Africa by various analysts and institutions also point to labour and power as central concerns. The industry also needs to regain investor confidence by effectively responding to rising costs and increasing volatile commodity prices and other challenges such as labour unrest. Companies that have embarked on embracing new forms of innovation will undoubtedly lay the foundation for long term sustainability and growth. Despite reduction in production in most commodities, coal maintained its strong position as the leading commodity revenue earner, with production increasing by almost 2 per cent

In recent years, most investment in the mining sector has come principally from existing Greenfield projects and from companies rationalizing or restructuring their assets to reduce operating costs, rather than from new projects. For mining to be sustainable, it requires ongoing and extensive exploration, given the time it takes to bring new mines into production. There has been a curtailment of investment in exploration during 2014, continuing the trend of 2012 and 2013. The decrease in exploration expenditure is scarcity of risk capital available to junior miners who are principal drivers of exploration, raising concerns as to the future health of the mining industry. South Africa has slipped to the 6th most important mining jurisdiction in Africa, amid growing concerns over low resource prices, high rand costs, unstable and expensive labour, unreliable electricity supply and perceived legislative and regulatory uncertainty.

While the good times for commodity prices may be a thing of the past, there are marginal signs that show otherwise. Prices are slowly moving in the right direction. Unfortunately gold price is expected to decline over the next five years, with higher costs contributing to profit declining. However prices of most commodities are still higher than they were a decade ago. The price of copper which averaged US$2 000 per ton fifteen years ago averaged around US$6 860 per ton in 2014. In the same period, the price of nickel averaged US$7 000 per ton, but today, it is more than double at US$16865. Uranium which averaged US$12 per pound is now around US$40. Most aggregate industrial metals price indexes have more than doubled since 2003, while in the past 10 years the price of coal has gone from around US$30 to over US$80 per ton. It is indeed difficult to find any mineral commodity that is not worth at least double what it was worth 10 years ago.

PART TWO: REVIEW OF SELECTED COMMODITIES

PRECIOUS METALS AND MINERALS OVERVIEW

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PRODUCTION AND SALES

South Africa was the world's largest producer of platinum-group metals (PGMs) and the sixth largest producer of gold, in 2014. The country's PGMs and Gold production jointly stood at 340 tons (t) in 2014 (Table 15), a 19.8 percent decline when compared with 2013. South Africa's gold and PGMs production declined by 5.3 percent and 28.7 percent respectively, due to a five month long strike in major South Africa's PGM mines, during the first half of 2014 which had a significant effect on global supplies. The precious mineral's total sales mass (excluding diamonds) amounted to 374.6 t, a 5.7 percent drop compared with 2013. The decline in the total sales was mainly as a result of a 13.7 percent drop in the PGMs total sales mass in line with lower output as well as reduced gross platinum demand, down 4.5 percent to 258 t. Despite the weaker rand (R/$) in 2014, the total sales revenue fell by 5.5 percent, due to lower gold and platinum prices and total sales mass in the same period.

TABLE 15: SOUTH AFRICA'S PRODUCTION AND SALES OF PRECIOUS METALS, 2014.

COMMODITY	YEAR	PRODUCTION	LOCAL SALES		EXPORT SALES		TOTAL SALES	
		t	t	R million	t	R million	t	R million
GOLD	2014	151.6	8.5	3 450	136.0	59 898	144.6	63 349
	2013	159.7	7.5	3 313	123.3	53 845	130.8	57 158
PGMs	2014	188.4	28.5	10 640	201.5	66 860	230.0	77 501
	2013	264.2	27.8	8 886	238.7	75 348	266.5	84 234
DIAMONDS (Mct)	2014	***8.06***	3.13	8 744	5.62	7 731	8.75	16 474
	2013	8.16	3.42	7 544	3.77	4 792	7.19	12 335
PRECIOUS METAL'S TOTAL	2014	****340***	****37***	***22 834***	****338***	***134 479***	****375***	***157 324***
	2013	****424***	****35***	***19 743***	****362***	***133 985***	****397***	***166 515***

Source: DMR, Directorate Mineral Economics

**Gold and PGMs totals only*

Global rough diamond production decreased by 3.9 percent to 124.8 Million carats (Mct) in 2014 (Table 15), with an estimated value in excess of 14.49 billion. South Africa ranked as the seventh largest producer by volume, with an output of 8.1 Mct, a decrease of 0.8 percent compared with 2013. In addition, the country was the fourth largest producer by value, producing $1 519 million worth of rough diamonds.

EMPLOYMENT

The precious metals and minerals sector's employment stood at 323 069 in 2014, a 4.2 percent drop compared with 2013, (Table 16). Gold and PGMs sectors' employment dropped by 9.8 percent and 1.8 percent, respectively, while the diamond sector increased by 16.3 percent, due to an increased number of expansion projects in the diamond sector. The precious metals and minerals sector remained the leading employer, accounting for 64 percent of total mining employment in 2014.

TABLE 16: EMPLOYMENT AND REMUNERATION IN SOUTH AFRICA'S PRECIOUS METALS AND MINERALS MINES, 2009 - 2013.

YEAR	AVERAGE NUMBER OF EMPLOYEES	TOTAL REMUNERATION (R'000 000)	AVERAGE REMUNERATION R/employee
2009	356 197	44 064	123 707
2010	350 181	48 366	138 117
2011	352 570	53 614	152 066
2012	352 224	59 052	167 655
2013	337 189	63 523	188 390
2014	323 069	61 412	190 090

Source: DMR, Directorate Mineral Economics

OUTLOOK

The lower than expected prices for Gold and PGMs, in particular Platinum due to reduced demand has put pressure on these sectors in 2014. According to Gold survey, total world gold demand is expected to increase slightly in 2015, owing to increases of investment-grade jewellery demand from India (for wedding bands) coupled with coin and bar purchases. In-line with the weaker R/$ exchange rate, the average gold price in dollar terms is expected to decrease by 5.7 percent from $1 266.27/oz in 2014 to $1 206.40/oz in 2015. Bearish gold prices coupled with rising costs are expected to put additional pressure on South Africa's gold sector.

PGMs demand is forecast to rise, particularly from the automotive sector due to tighter emissions legislation in Western Europe. In addition, platinum demand is expected to be boosted further by increased jewellery demand, with growth expected in China, the US, India and Western Europe. PGMs production and global supplies are expected to increase substantially in 2015 due to increased production from South Africa post the 5 months strike, which impacted production in 2014.

Despite anticipated diamond production challenges globally, supply is nearly expected to match the demand which will follow fresh demand for jewellery bands in China and India. South Africa's production and export of rough diamonds is expected to increase significantly in 2015 through to 2017, assisted by various expansion projects and production build-ups. In addition, local production will increase on the back of De Beers' Venetia mine exploiting higher-grade KO2 material in 2015.

REFERENCES

1. *DMR, Directorate Mineral Economics.*
2. *GFMS Platinum, Palladium and Gold Survey, 2015.*
3. *Kimberley Process Certification Scheme Statistics.*

DIAMONDS

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SUPPLY-DEMAND

Global rough diamond production decreased by 3.9 percent to 124.8 Million carats (Mct) in 2014 (Table 17), with an estimated value in excess of $14.49 billion. The Russian Federation remained the largest global producer in terms of volume, contributing 30.7 percent and 25.8 percent to global production and value, thereby overtaking Botswana's production by value. Botswana's production by volume and value was second, contributing 19.8 percent and 25.2 percent, respectively to global production.

TABLE 17: WORLD ROUGH DIAMOND PRODUCTION, 2014.

	MASS		*VALUE*		
	Mct	*%*	*US$ mil*	*%*	*$/ct*
Angola	8.8	7.1	1 317	9.1	149.86
Australia	9.3	7.5	304	2.1	32.76
Botswana	24.7	19.8	3 646	25.2	147.84
Canada	12.0	9.6	2 003	13.8	166.78
DR of Congo	15.7	12.5	134	0.9	8.72
Namibia	1.9	1.5	1 156	8.0	602.57
Russian Federation	38.3	30.7	3 733	25.8	97.47
Sierra Leone	0.6	0.5	221	1.5	357.50
South Africa*	8.1	6.5	1 519	10.5	164.76
Zimbabwe	4.8	3.8	239	1.6	50
Other	0.7	0.6	224	1.5	320
Total: 2014	*124.8*	*100.0*	*14 495*	*100.0*	*116.17*
2013	*129.8*		*13 971*		*107.66*

Source: KPCS Statistics
** DMR, Directorate Mineral Economics*

South Africa (SA) ranked as the seventh largest producer by volume, with an output of 8.1 Mct, a decrease of 0.8 percent compared with 2013. In addition, the country was the fourth largest producer by value, producing $1 519 million worth of rough diamonds. Kimberlite pipe mining accounted for 96.6 percent of the country's production, while alluvial and marine diamonds made up the remaining 3.4 percent. De Beers and Petra Diamond jointly produced 96.4 percent of diamonds from kimberlites, while Alexkor and Trans-Hex jointly produced 90.3 percent of marine diamonds.

Preliminary statistics indicate that 38.8 percent by volume of SA's rough production was sold locally to the cutting and polishing industry, down from 41.8 percent in 2013. Despite a decrease in local sales mass by 7.9 percent local sales value increased by 16.6 percent, supported by a 13.2 percent increase of rough diamond prices from $145.54/ct in 2013 to $164.76/ct in 2014. The State Diamond Trader continues to promote the local cutting and polishing industry by sourcing 10 percent of Run-of mine (Rom) production from diamond producers to beneficiaries. Export sales mass increased by 61.3 percent (Table 18), as a result of the positive growth of developing diamond markets of the cutting and polishing industry in China and India, stimulating demand for rough diamonds.

TABLE 18: SOUTH AFRICA'S ROUGH DIAMOND PRODUCTION AND SALES, 2014.

	Production	Local sales		Export sales		Total Sales	
Kimberlites	*Mass (cts)*	*Mass (cts)*	*Value (R mil)*	*Mass (cts)*	*Value (R mil)*	*Mass (cts)*	*Value (R mil)*
2014	7 785 359	2 859 816	5 797	5 562 163	6 884	8 421 979	12 681
2013	7 899 166	3 195 984	5 534	3 703 682	4 163	6 899 666	9 697
% Change	*-1.4*	*-10.5*	*4.7*	*50.2*	*65.4*	*22.1*	*30.8*
Alluvial							
2014	247 712	238 289	2 738	50 202	738	288 491	3 477
2013	197 575	176 178	1 824	51 044	517	227 222	2 341
% Change	*25.4*	*35.3*	*50.1*	*-1.6*	*42.8*	*27.0*	*48.5*
Marine							
2014	27 302	31 099	208	7 466	108	38 565	316
2013	31 966	26 186	141	13 356	113	39 542	254
% Change	*-14.6*	*18.8*	*47.6*	*-44.1*	*-4.1*	*-2.5*	*24.6*
Total							
2014	8 060 373	3 129 204	8 744	5 619 831	7 731	8 749 035	16 474
2013	8 128 707	3 398 348	7 500	3 768 082	4 792	7 166 430	12 292
% Change	*-0.8*	*-7.9*	*16.6*	*49.1*	*61.3*	*22.1*	*34.0*

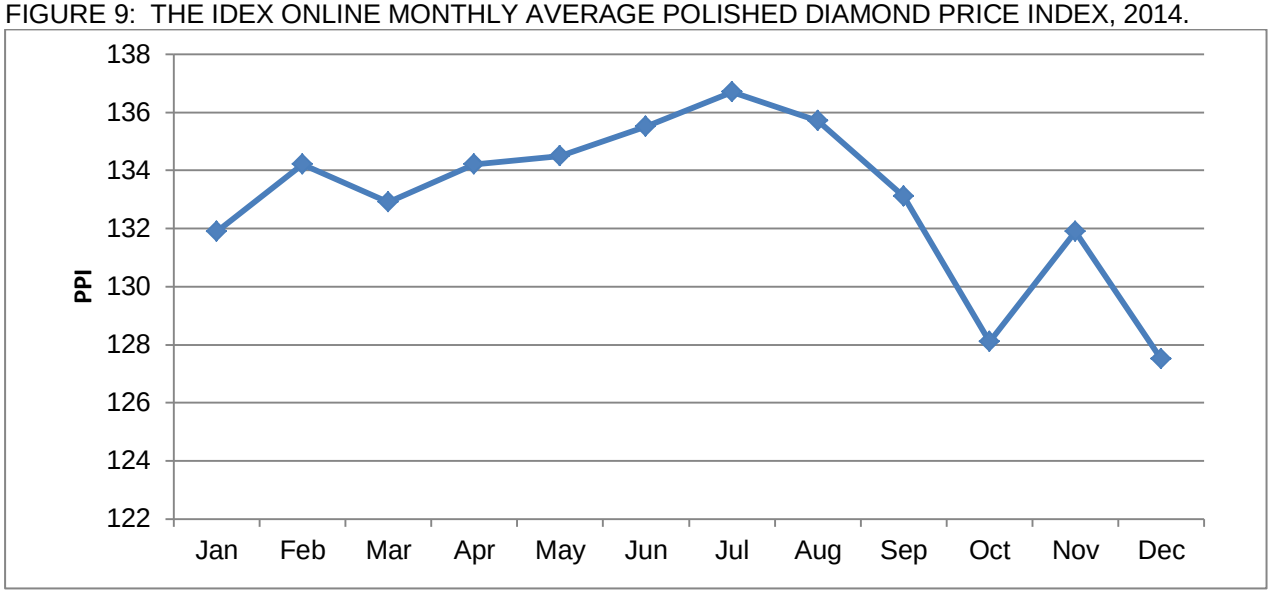
Source: DMR, Directorate Mineral Economics

According to De Beers' Diamond Insight Report 2015, global demand for rough diamonds during 2014 was strengthened by an increase in demand for branded diamond jewellery for product differentiation, distinctive design, authenticity and quality. Global demand for polished diamonds grew by 4.5 percent, due to the improved uptake in the United States (US) markets in 2014. The US became the major export market for polished diamonds from both Israel and Belgium, while the United Arab Emirates (UAE) remained the top export destination of polished stones from India. Demand was also driven by China and India's developing-diamond markets, which grew by 6.0 percent and 3.0 percent, respectively measured in South African (SA) currency.

PRICES AND REVENUE

The International Diamond and Jewellery Exchange (IDEX) online global polished diamond price index (PPI) indicates that average global polished diamond prices increased by 0.1 percent to 133.0 in 2014 reinforced by a stronger US economy. Average polished prices increased by 1.3 percent from the first to second quarter despite being restricted by weaker global demand for polished stones (Figure 9). Price volatility started to appear at the end of the third quarter, with prices dropping further by 1.9 percent between August and September 2014, as a result of sluggish Chinese demand. In contrast, prices regained some ground between October and November, increasing by 3.0 percent as a result of being aided by stronger global demand.

FIGURE 9: THE IDEX ONLINE MONTHLY AVERAGE POLISHED DIAMOND PRICE INDEX, 2014.



Note: PPI 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 2005-March 2006, taken as a standard year. *Source: IDEX Online.*

KEY DEVELOPMENTS

Petra Diamond's Cullinan mine continued with a roll-out of expansion and development plans. The C-Cut expansion project at the Cullinan mine, known as C-Cut Phase 1, on the western side of the orebody is 50 percent complete in terms of physical development and capital expenditure. According to Petra, The section will deliver its first ore in 2016, followed by a production build-up through 2017 and 2018 to its target of 4 million tons per year (t/py).

Petra Diamond's Finch mine's recovery plant realized a higher Run-of-Mine (ROM) production during 2014, resulting in an average grade of 38.1 carats per hundred tons (cpht), increasing the detection and recovery of high quality stones within the orebody.

Petra Diamonds announced the sale of a 29.62 ct blue diamond, recovered from its Cullinan mine in February 2014, for an estimated US$25.6 million. The diamond was bought by Cora International, New York through a SA Company, Golden Yellow Diamonds. On 6 June 2014, the company announced the recovery of a 122.5 ct blue diamond at the mine, sold for $27.6 million in September 2014.

De Beers reported that one of the planned decline shafts at its Venetia mine expansion project had reached 780 meters (m) of linear development by March 2014. The construction of the production and services shaft which was started in 2013, will be sunk to a final depth of 1 040 m. In October 2014, a R2.6 billion contract was awarded to a major construction company in order to build the shaft complex. The contract includes the sinking, equipping and the commissioning of the decline tunnel and ramp with two vertical shafts. The horizontal development of the tunnel will provide access to loading levels.

On 30 October 2014, De Beers Diamonds completed the sale of its Namaqualand Mines with resources of between 1.6 Mct and 1.9 Mct, at a cost of R166 million. The buyer, Emerald Panther Investments, a BEE consortium, controlled by Trans-Hex is expected to commence mining at Namaqualand in 2014. De Beers will retain US$17.4 million of the rehabilitation liabilities, and will complete the bulk rehabilitation work by 2016, focusing on earth-moving and surface-profiling.

EMPLOYMENT

Employment in the diamond industry increased by 16.3 percent to 15 795, year-on-year (y-o-y) (Table 19), due to an increased number of expansion projects in the sector. Permanent employment grew by 6.7 percent, while the employment of contractors grew by 38.6 percent, y-o-y. Total remuneration increased by 27.9 percent to over R3 billion, thereby raising the average remuneration per employee by 9.7 percent to R193 183. The average productivity per employee decreased by 13.3 percent from 593.6 ct in 2013 to 514.6 ct in 2014.

TABLE 19: EMPLOYMENT (INCLUDING CONTRACTORS) AND REMUNERATION IN SOUTH AFRICA'S DIAMOND MINING INDUSTRY, 2010-2014.

YEAR	AVERAGE NUMBER OF EMPLOYEES	TOTAL REMUNERATION (R'000)	AVERAGE REMUNERATION (R/employee)
2010	11 159	1 912 019	171 343
2011	12 030	2 142 965	178 135
2012	12 176	2 404 916	197 512
2013	13 579	2 392 113	176 162
2014	15 795	3 051 396	193 183

Source: DMR, Directorate Mineral Economics

OUTLOOK

Global rough diamond production is expected to increase marginally, even when the world's major mines are likely to struggle to maintain previous record high levels of output. Despite anticipated production challenges globally, supply is nearly expected to match the demand which will follow fresh demand for jewellery bands in China and India. In addition, renewed demand from established markets, such as the US and Japan is expected to increase. Diamond prices could become bearish as supply increases in the short to medium term.

SA production and export of rough diamonds is expected to increase significantly in 2015 through to 2017, assisted by various expansion projects and production build-ups. In addition, local production will increase on the back of De Beers' Venetia mine exploiting higher-grade KO2 material in 2015. Transhex's purchase of the Namaqualand diamonds mine will, in turn, facilitate exploitation of marine diamond mining.

REFERENCES

1. *DMR, Directorate: Mineral Economics.*
2. *Kimberley Process Certification Scheme Statistics.*
3. *IDEX Online.*
4. *State Diamond Trader Annual Report 2015.*
5. *www.debeersgroup.com.*
6. *www.petradiamonds.com*
7. *www.rockwelldiamonds.com*
8. *Miningmx, May 2014.*
9. *South Africa Mining Report Q3 2015.*
10. *http://www.miningweekly.com/article/trans-hex-takes-over-namaqua-diamond-mines-from-de-beers-2014-10-29*
11. *Diamond Industry White Paper*

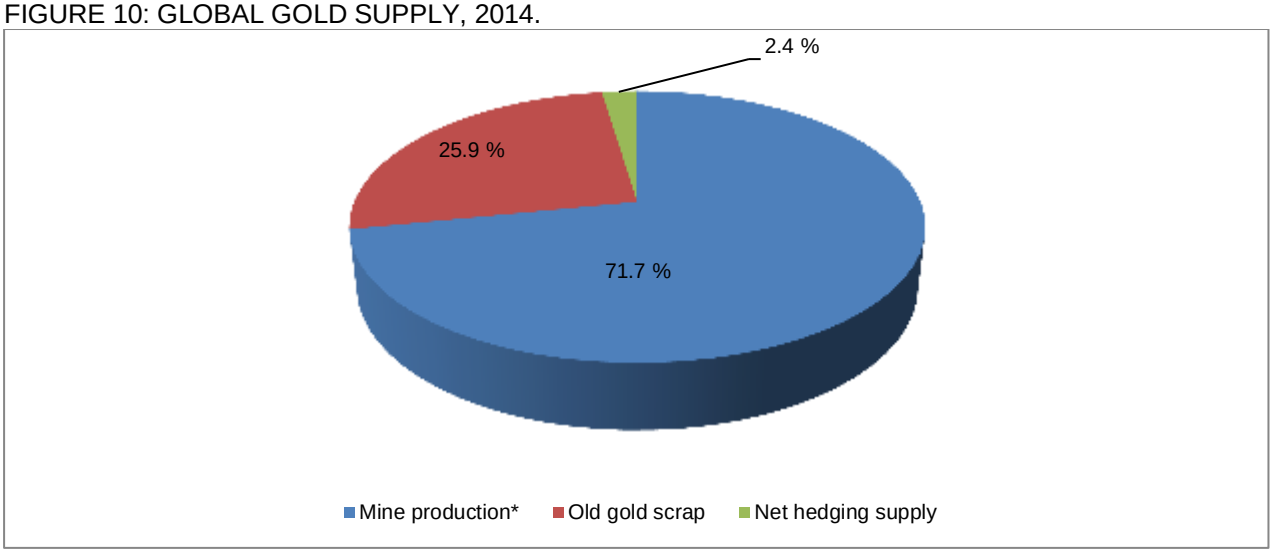
GOLD

PJ Perold

SUPPLY AND DEMAND

Total world gold supply, which includes mine production, scrap supply and producer hedging increased by 1.4 percent from 4 291.4 t in 2013 to 4 350.3 t in 2014. Global scrap supply (old gold scrap), which accounted for 25.9 percent of total supply, decreased by 12.6 percent compared with 2013 (Figure 10). Mine production, at 3 121.0 t accounted for 71.7 percent of total supply and increased by 2.5 percent, due to positive spin-off effects made possible by prior investments during the years of higher average gold prices. Global production increased as a result of the ramp-up of 4 major international gold projects from the previous year. China remained the largest producer, contributing 14.8 percent to world production, followed by Australia and Russia, at 8.7 percent and 8.4 percent, respectively. Producers added roughly 103t to the global hedge book, the highest since 1999.

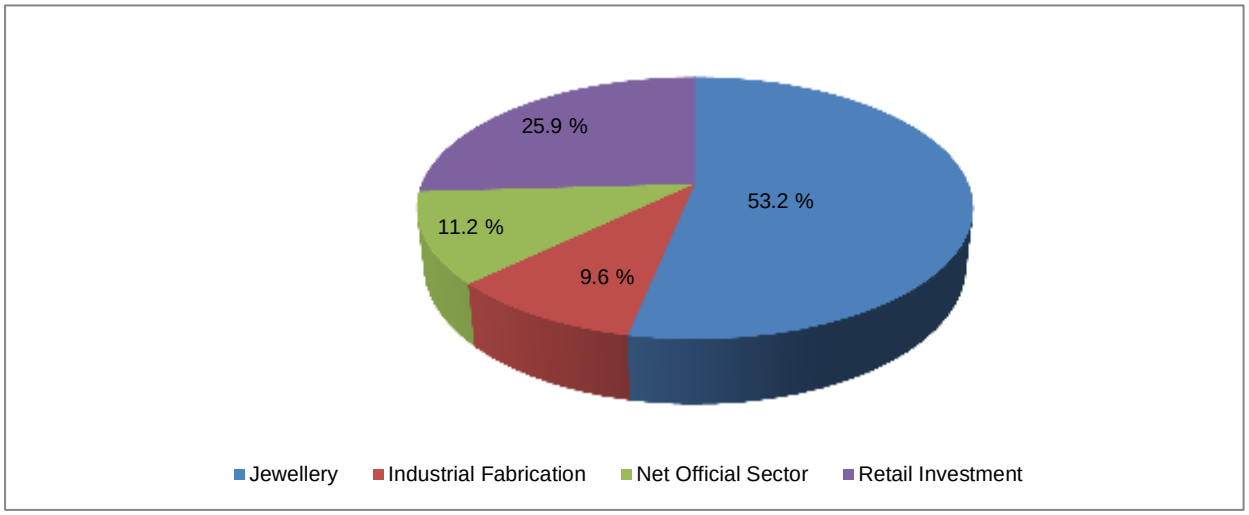
FIGURE 10: GLOBAL GOLD SUPPLY, 2014.



Source: Klapwijk, et al, 2015, pp 8 – 9
*Adjusted Global Figure: **

Total world gold demand decreased by 18.0 percent from 5 041 t in 2013 to 4 158 t in 2014, mainly as a result of a 9.0 percent decline in jewellery fabrication and a 39.0 percent slump in physical bar investment. Jewellery demand and retail investment (inclusive of bars and coins) contributed 53.2 percent and 25.9 percent, respectively to total demand in 2014, while net official sector purchases and industrial fabrication contributed 3.0 percent and 6.0 percent, respectively (Figure 11). Net official sector recorded a fifth successive year of net purchases, increasing by 13.0 percent to 466 t. The volume of total identifiable investment which consists of bars and coins and Exchange Traded Funds (ETF's) increased by 3.0 percent to 919 t. However, its value decreased by 8.0 percent to $37 billion.

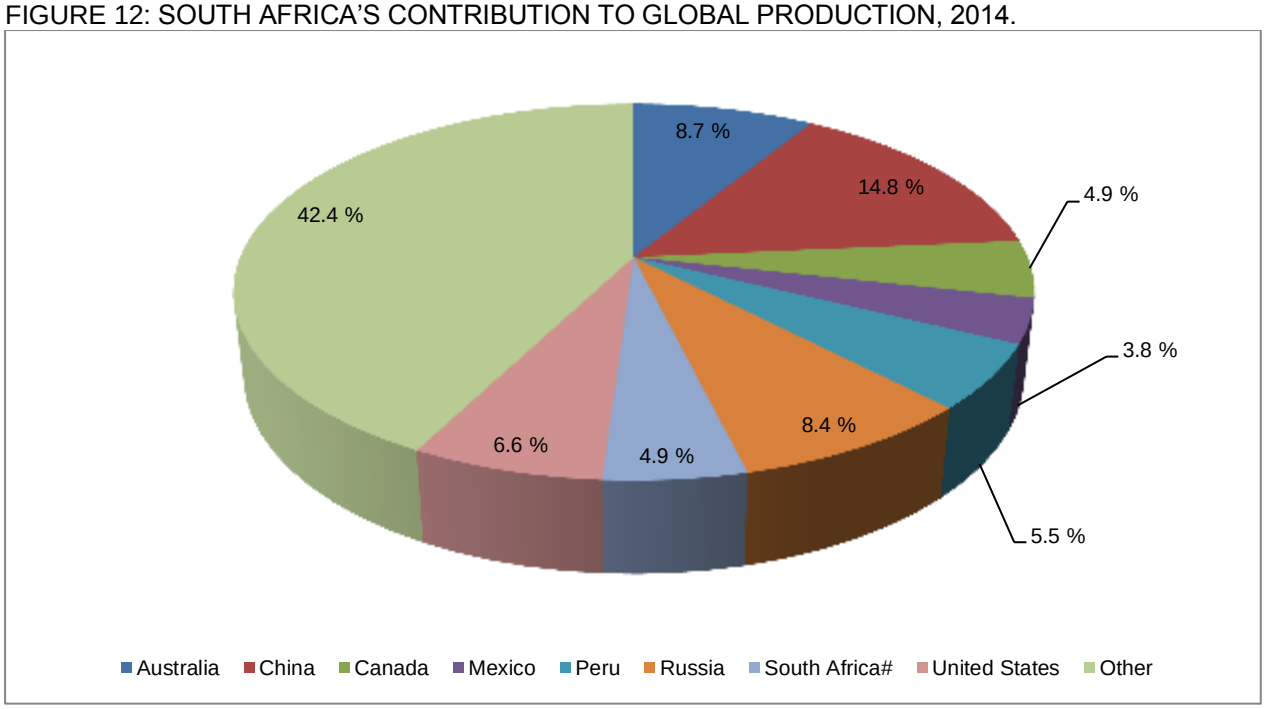
FIGURE 11: WORLD GOLD DEMAND MARKETS*, 2014.



Source: Klapwijk, et al, 2014, pp 8 – 9

South African production decreased by 4.6 percent from 158.9 t in 2013 to 151.6 t in 2014, contributing roughly 5.5 percent to global production, retaining its position as the sixth largest producer (Figure 12). The country's gold production has been on a declining trend over the years, due to lower grades, challenges of deep-level gold mining as well as lower recovery of scrap-gold.

FIGURE 12: SOUTH AFRICA'S CONTRIBUTION TO GLOBAL PRODUCTION, 2014.

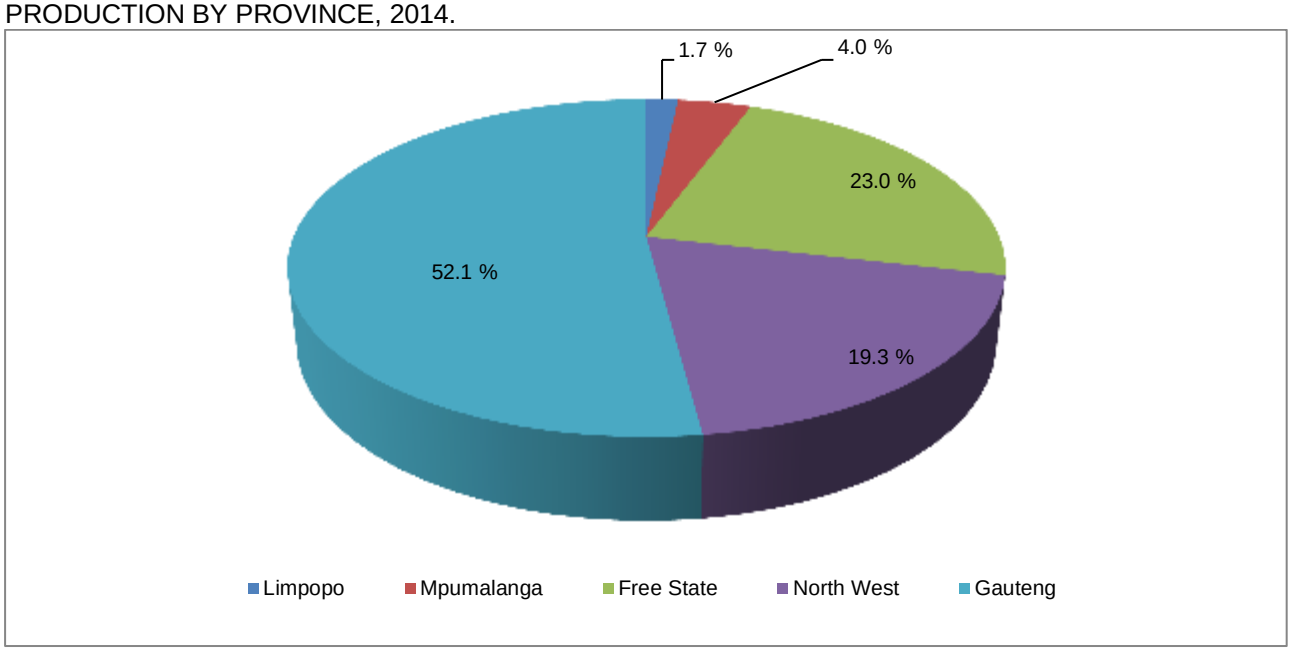


Sources: USGS, 2015, pp 66-67, Klapwijk, et al, 2015, pp 40 - 41
DMR, Directorate Mineral Economics, 2014-2015: #

South Africa produced rough gold bullion mainly from 28 primary gold mining operations, 3 uranium plants and 3 recovery operations. Primary mining operations contributed 91.7 percent to gold rough bullion, followed by uranium and recovery operations, at 4.5 and 0.4 percent, respectively. In addition, the metal was recovered as a by-product from 32 PGMs mines, 1 copper anode-slimes dam and 1 antimony mine, which jointly contributed 3.37 percent to total production. Primary gold mines' production decreased by 3.1 percent, due to production stoppages and the decommissioning of a gold mine in the first quarter of 2014.

In terms of production by provinces, Gauteng remained the largest producer at 52.1 percent of total production, followed by the Free State and North West Provinces at 23.0 percent and 19.3 percent, respectively (Figure 13).

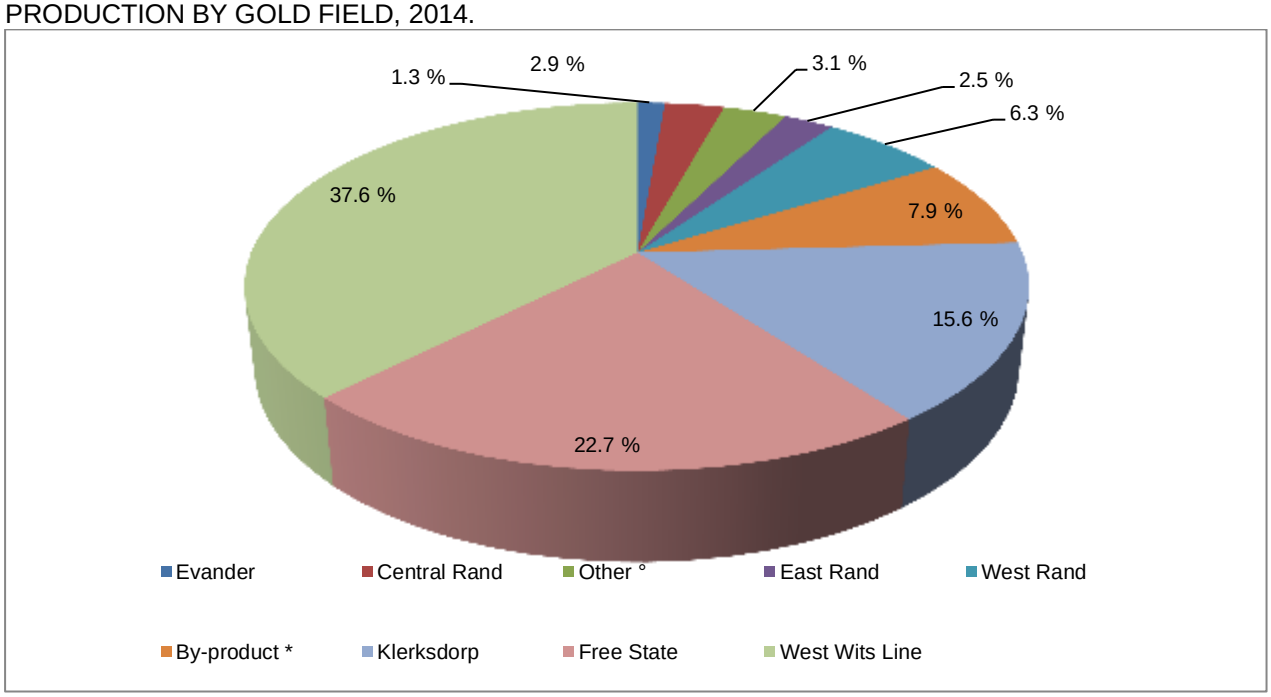
FIGURE 13: SOUTH AFRICA'S PRIMARY GOLD PRODUCTION AND CONTRIBUTION TO TOTAL PRODUCTION BY PROVINCE, 2014.



Source: DMR, Directorate Mineral Economics-2014, 2015

In terms of production by goldfield, the West Wits Line yielded the largest gold production, accounting for 37.6 percent of total production, followed by Free State and Klerksdorp at 22.7 percent and 15.6 percent, respectively (Figure 14). The remaining goldfields, inclusive of by-product from recovery plants and production, contributed the remaining 24.1 percent to total production.

FIGURE 14: SOUTH AFRICA'S PRIMARY GOLD PRODUCTION AND CONTRIBUTION TO TOTAL PRODUCTION BY GOLD FIELD, 2014.



Source: DMR, Directorate Mineral Economics: 2014-2015
Note: ° Gold mines outside the Witwatersrand Basin
** Platinum and base metal mines*

South Africa's markets consist of fabrication and specialised uses, such as dentistry and electronic fabrication, as well as gold reserves purchases through South African Reserve Bank (SARB). Since 2010, Central Banks have been net buyers of gold, driven in part by uncertainty over the future of the international monetary systems and the need to diversify reserves. The SARB gold reserves declined slightly (0.03 percent) from 125.09 t in 2013 to 125.13 t in 2014, due to the placing of small gold deposits on the international market. However, gold reserve value decreased substantially by 7.1 percent from R59.3 billion in 2013 to R55.1 billion in 2014, in-line with a bearish gold price.

Local sales mass decreased by 15.1 percent to 8.5 t in 2014, in-line with a decrease in demand for fabrication, jewellery manufacturing and specialised uses, such as dentistry and electronics (Table 20). Export sales mass decreased by 10.2 percent from 151.5 t in 2013 to 136.0 t in 2014, as direct sales receipts to overseas entities, inclusive of banks decreased.

TABLE 20: SOUTH AFRICA'S PRODUCTION AND SALES OF GOLD, 2005-2014

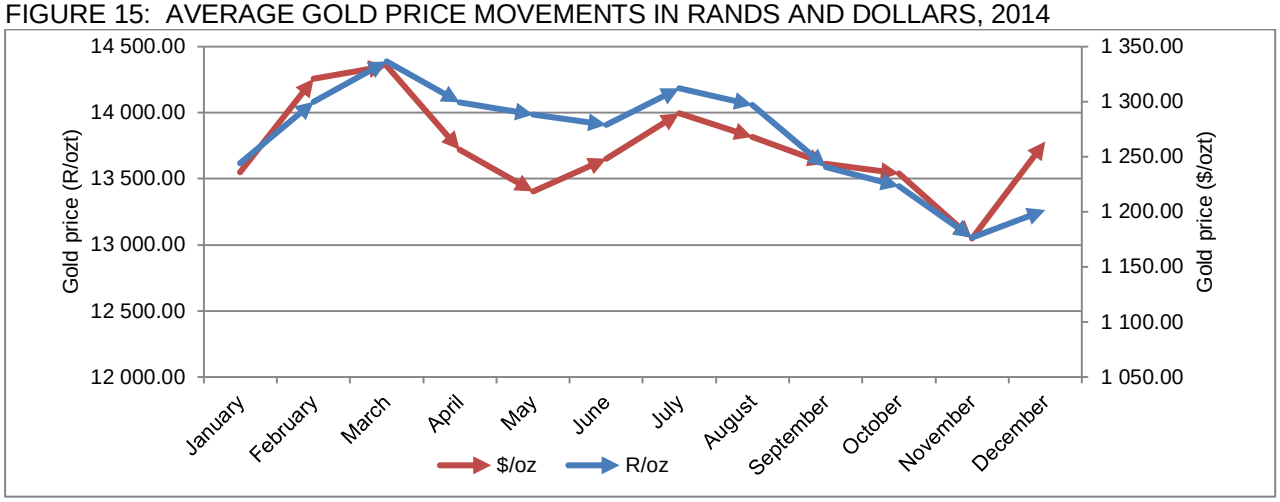
Year	Production	Local sales		Export sales		Total Sales	
		Mass	Value R'000	Mass	Value R' 000	Mass	Value R'000
2005	294.7	4.6	419 622	265.4	24 181 619	270.1	24 601 241
2006	272.1	5.7	720 790	277.4	36 722 302	283.1	37 443 092
2007	252.6	13.2	2 081 731	229.3	35 953 993	242.6	38 035 724
2008	212.6	8.8	1 997 761	190.0	43 994 483	198.8	45 992 244
2009	197.6	6.6	1 701 334	180.6	46 994 169	187.2	48 695 503
2010	188.7	7.2	2 055 698	176.9	51 037 449	184.1	53 093 147
2011	180.3	10.2	3 633 111	175.5	65 258 302	185.7	68 891 413
2012	154.2	11.3	4 862 748	164.9	71 961 757	176.2	76 824 504
2013	158.9	10.0	4 192 863	151.5	65 793 912	161.5	69 986 775
2014	151.6	8.5	3 450 974	136.0	59 898 125	144.6	63 349 098
Y-o-y (%)	*-4.6*	*-15.1*	*-17.7*	*-10.2*	*-9.0*	*-10.5*	*-9.5*

Source: DMR Statistics: 2005-2015

PRICES AND REVENUES

The average dollar gold price, at $1 266.27/oz was 10.7 percent lower in 2014 compared with 2013. Average annual prices fell by 3.4 percent from $1 244.04/oz in January 2014 to $1 201.37/oz in December 2014 (Figure 15). The fall was akin to strong growth of US equity markets and to a lesser extent, an increase in fixed income, which exerted pressure on the gold price. In contrast, a weakening R/$ exchange rate increased R/oz prices by 1.7 percent to R13 779.7/oz over the same period.

FIGURE 15: AVERAGE GOLD PRICE MOVEMENTS IN RANDS AND DOLLARS, 2014



Source: LBMA, 2014, 2015
SARB, 2014, 2015

Weak US employment data provided some leverage for the average gold price, increasing by a little over 1.7 percent to $1 293.40/oz in the first quarter of 2014. By the second quarter however, the average $/oz gold price decreased by 0.4 percent to $1 288.60/oz due to a stronger US Leading Economic Index (USLEI) coupled with job growths. The corresponding R/oz prices averaged R14 055/oz in the first quarter and R13 589/oz in the second quarter. Between the second and third quarter the gold price remained somewhat steady at $1 285.85/oz. due to global instability, particularly in Turkey. This resulted in the corresponding R/oz price increasing by 1.6 percent to R13 589/oz. However, by the fourth quarter, the average price declined by a staggering 6.4 percent as higher interest rates, coupled with a strong growth in US equity markets became more prevalent.

Lower annual gold prices coupled with a drop in the total sales mass, resulted in total sales value decreasing by roughly 9.5 percent from R69.98 billion in 2013 to R63.34 billion in 2014 (Table 20). Despite a 12.4 percent weaker R/$ exchange rate in 2014 compared with 2013, export revenue declined by 9.0 percent due to a 10.7 percent and 10.2 percent drop in the $/oz gold price and export mass respectively, in the same period.

KEY DEVELOPMENTS

Diversification, expansion and various proposed initiatives for renewed exploration were but some of the positive characteristics that defined the local gold industry in the first quarter of 2014. New technology as well as two major acquisitions managed to quell speculation of gold mining industry decline. This was, however amidst an environment of cost-cutting, wage disagreements, power outages and illegal activities that became more prevalent during the fourth quarter of 2014.

Gold Fields and Harmony announced the expansion of two projects during April 2014. The combined ore-capacity has been estimated at roughly 292 000 tons per month (t/pm), with the prospect of increased grades at one of the producers. One of the expansions resulted in the creation of more than 300 jobs, while the other expansion project was placed on hold, due to lower average gold prices during the period.

Cost-cutting initiatives affected Sibanye Gold and Goldfields, particularly in the third quarter of 2014. This resulted in the companies announcing a reorganisation of their corporate structures and a suspension of low-yielding mines. In addition, the low gold price resulted in the announcement of the reduction of Goldfields exploration activities, amounting to $202 million. Goldfields announced additional asset write-downs of between R2.4 and R2.6 billion.

On the 18th of October 2014, Sibanye Gold announced the issuing of 17.0 percent of its stock, equal to R1.2 billion of its current market value to Gold One. The assets consist of underground gold and uranium (U_3O_8) reserves, which have been developed to produce between 260 000 pounds (lb) and 570 000 lb of U_3O_8 by-product over the next five years.

Pan African Resources acquisition of Harmony Gold's Evander mines is expected to boost the company's production to 200 000 oz/year. This acquisition, which was estimated at R322.4 million in 2012 has aided with the payment of current dividends, amounting to R250 million to its shareholders.

EMPLOYMENT

Total employment in the gold mining sector fell by 9.8 percent from 131 738 in 2013 to 118 794 in 2014, due to the decommissioning of a mine, coupled with the suspension of a major operation in the Free State (Table 21). As a result, total remuneration decreased by 3.3 percent in the same period.

TABLE 21: SOUTH AFRICA'S GOLD MINES, EMPLOYMENT AND REMUNERATION, 2010 – 2014.

YEAR	NUMBER OF EMPLOYEES*			REMUNERATION		
	Total	Male	Female	Total R ' 000	Male R ' 000	Female R ' 000
2010	157 019	145 865	11 154	19 844 856	18 481 016	1 363 840
2011	144 799	133 172	11 627	20 840 802	19 219 230	1 621 572
2012	142 201	129 940	12 261	22 238 338	20 342 069	1 896 269
2013	131 738	119 394	12 345	23 470 035	21 349 841	2 120 195
2014	118 794	106 983	11 811	22 683 949	20 483 413	2 200 536

Source: DMR, Directorate Mineral Economics
*Note: *Average number of employees in service, including contractors*

OUTLOOK

Total world gold demand is expected to increase slightly in 2015, owing to increases of investment-grade jewellery demand from India (for wedding bands) coupled with coin and bar purchases. Physical demand, particularly bullion-demand is expected to increase as some sources indicate an increase in bullion purchases, despite the respite of the Greek debt crisis. This could assist increases in investment demand and Exchange Traded Funds (ETF's). Local demand is expected to increase, coinciding with a ramp-up of local jewellery hubs. Global production is expected to fall in 2015, due to a decrease in global production ramp-ups.

Gold scrap supply is expected to reach a plateau in 2015, in anticipation of a marginal slump in average annual price levels. The price in R/oz terms is forecast to increase by 5.3 percent to an average of R13 725/oz, aided by a 5.5 percent weaker R/$ exchange rate. In-line with the weaker R/$ exchange rate, the average gold price in dollar terms is expected to decrease by 5.7 percent from $1 266.27/oz in 2014 to $1 206.40/oz in 2015. Bearish gold prices coupled with rising costs are expected to put additional pressure on South Africa's gold sector. South Africa's production is expected to decrease by 4.0 percent to 143.9 t in 2015, due to a decrease in its mineable reserves, and an expected increase in production stoppages, due to operational challenges and possible wage disputes.

REFERENCES

1. *DMR, Directorate Mineral Economics statistics*
2. *Klapwijk P, Walker P, et al, 2014. Gold Survey 2015; GFMS Ltd, London, 121 pp*
3. *London Bullion Market Association, 2015. Internet Website: http://www.lbma.org.uk/?area=stats&page=gold/2001monthlygold*
4. *South African Reserve Bank, 2014, 2015. Internet Website: http://www.reservebank.co.za/internet/publication.nsf/*
5. *US Geological Survey, 2015. Mineral Commodity Summaries, 2015: Internet Website: http://minerals.usgs.gov/minerals/pubs/commodity/gold/mcs-2015-gold.pdf*
6. *The Jewellery Council of South Africa, 2010 – 2015*
7. *DMR, quarterly reports*

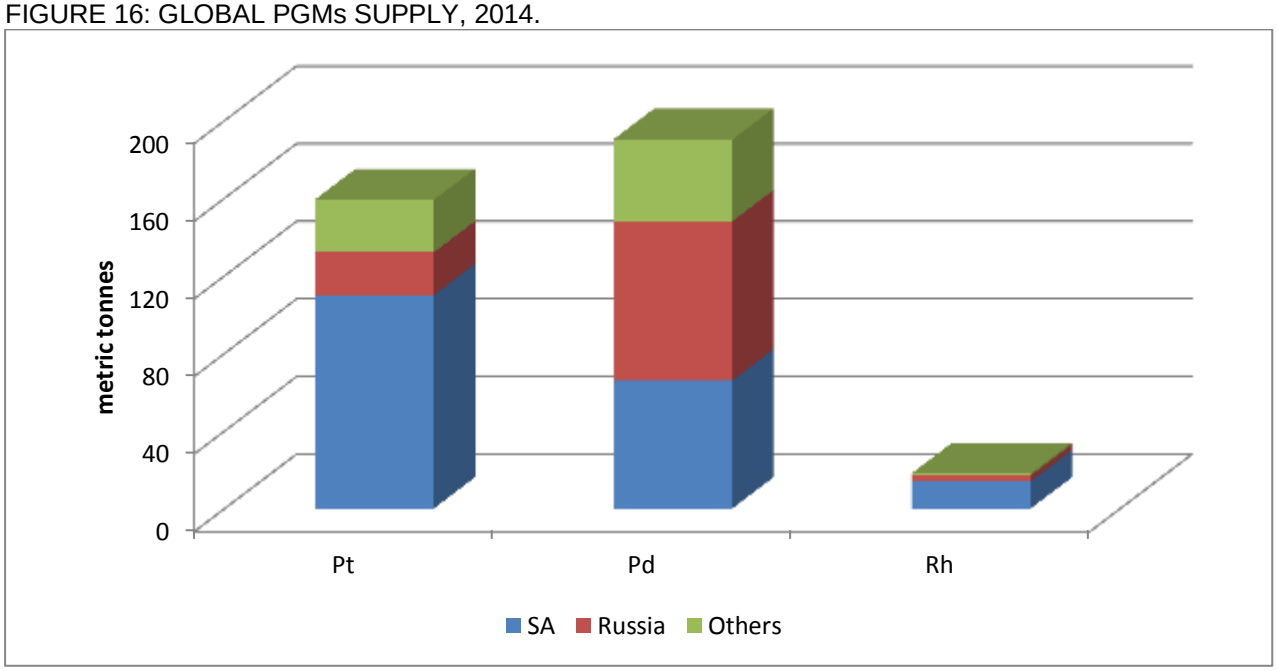
PLATINUM-GROUP METALS (PGMs)

DO Moumakwa

SUPPLY AND DEMAND

The 5-month long strike in major South Africa's (SA) platinum group metals (PGMs) operations during the first half of 2014 had a significant effect on global supplies. According to Johnson Matthey's PGMs Market Report, platinum supplies declined by 11.6 percent to 159 metric tonnes (t) in 2014, with SA accounting for 110 t, an equivalent of just under 70 percent (Figure 16). Russia supplied 13.8 percent, while others, including North America and Zimbabwe, accounted for the remaining 17 percent. Palladium supplies fell by 4.2 percent to 190 t, as supply shortfalls from SA were partially offset by an increase in Russian production. The two countries were jointly responsible for close to 80 percent of total supplies. Rhodium supplies were down 11.0 percent to 18 t, most of which (77 percent) were from SA.

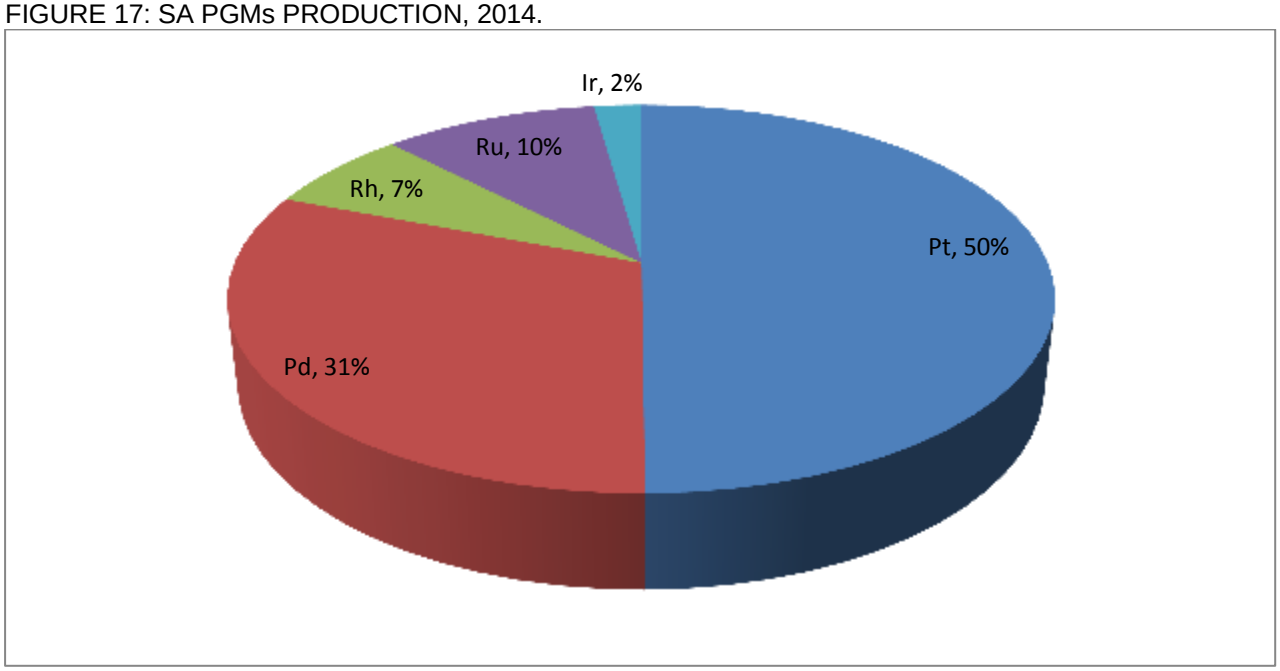
FIGURE 16: GLOBAL PGMs SUPPLY, 2014.



Source: Johnson Matthey's PGM Market Report, May 2015.

SA's PGMs production (including ruthenium and iridium) declined by 28.7 percent to 188.4 t, half of which was platinum (Figure 17). Palladium accounted for 31 percent of the country's production and, possibly for the first time in history, there was a greater output of ruthenium than rhodium. Despite an increase in local sales of 2.5 percent to 28.5 t, export sales fell by 15.6 percent to 201.5 t in line with lower output.

FIGURE 17: SA PGMs PRODUCTION, 2014.



Source: Directorate Mineral Economics.

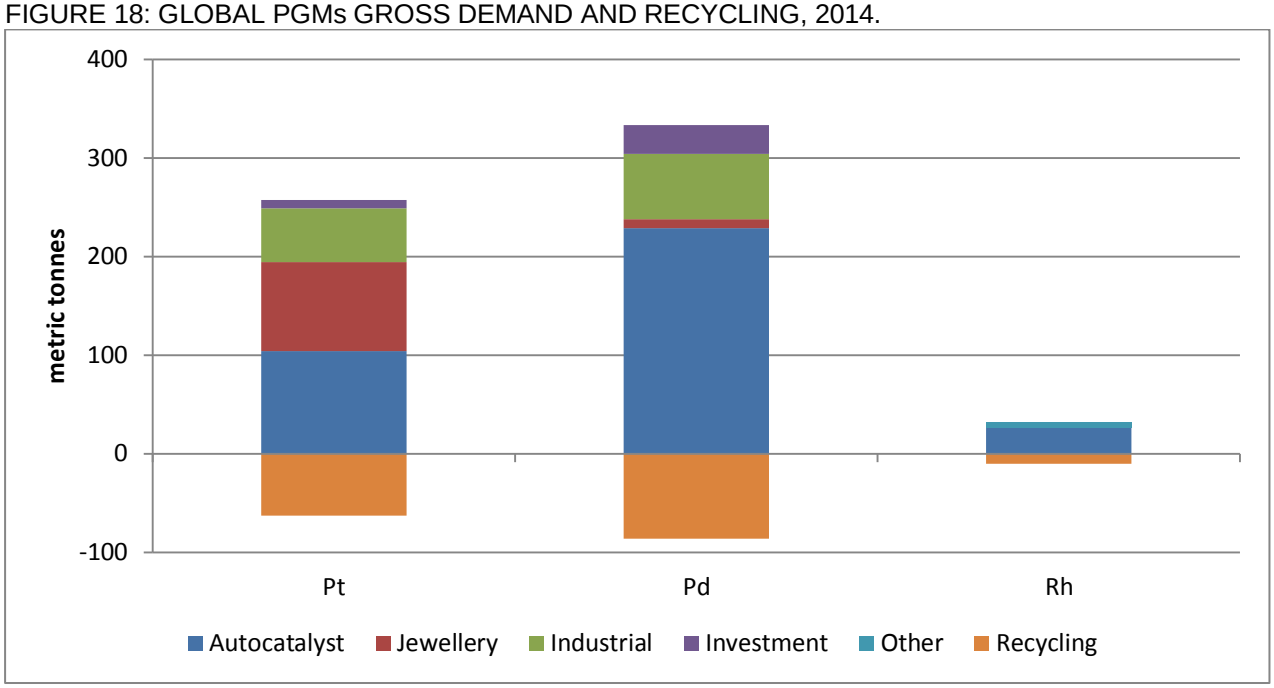
TABLE 22: SA PGMs MINE PRODUCTION AND SALES, 2014.

	Production	**Local sales**		**Export sales**		**Total Sales**	
Platinum	**Mass (t)**	**Mass (t)**	**Value (R mil)**	**Mass (t)**	**Value (R mil)**	**Mass (t)**	**Value (R mil)**
2014	94.0	12.7	6 162.3	98.4	46 118.0	111.1	52 280.3
2013	137.0	11.2	5 119.0	122.5	55 312.0	133.7	60 431.0
% Change	- 31.4	13.4	20.4	- 19.7	- 16.6	- 16.9	- 13.5
Palladium							
2014	58.4	14.6	4 089.7	51.2	13 529.0	65.8	17 618.7
2013	76.0	15.0	3 327.0	60.8	13 148.0	75.8	16 475.0
% Change	- 23.2	- 2.7	22.9	- 15.8	2.9	- 13.2	6.9
Rhodium							
2014	12.9	.8	350.7	13.4	5 100.9	14.2	5 451.6
2013	18.1	1.1	358.0	16.1	5 065.0	17.2	5 423.0
% Change	- 28.7	- 27.3	- 2.0	- 16.8	.7	- 17.4	0 .5
All PGMs							
2014	188.4	28.5	10 640.7	201.5	66 860.8	230.0	77 501.5
2013	264.2	27.8	8 886.1	238.7	75 348.5	266.5	84 234.6
% Change	- 28.7	2.5	19.7	- 15.6	- 11.3	- 13.7	- 8.0

Source: Directorate Mineral Economics.

The platinum market in 2014 was in deficit by between 22 t (World Platinum Investment Council, 2014 Review) and 35 t (PGM Market Report, May 2015), owing predominantly to the afore-mentioned labour dispute in SA (Table 22). According to World Platinum Investment Council (WPIC), this was despite a 6.9 percent decrease in total platinum demand, after a combined 6 t growth in automotive, jewellery and industrial applications was offset by a 25 t reduction in investment demand. The PGMs Market Report also notes a reduction in gross platinum demand, down 4.5 percent to 258 t, of which 64 t was accounted for by recycled metal (Figure 18).

FIGURE 18: GLOBAL PGMs GROSS DEMAND AND RECYCLING, 2014.



Source: Johnson Matthey's PGM Market Report, May 2015.

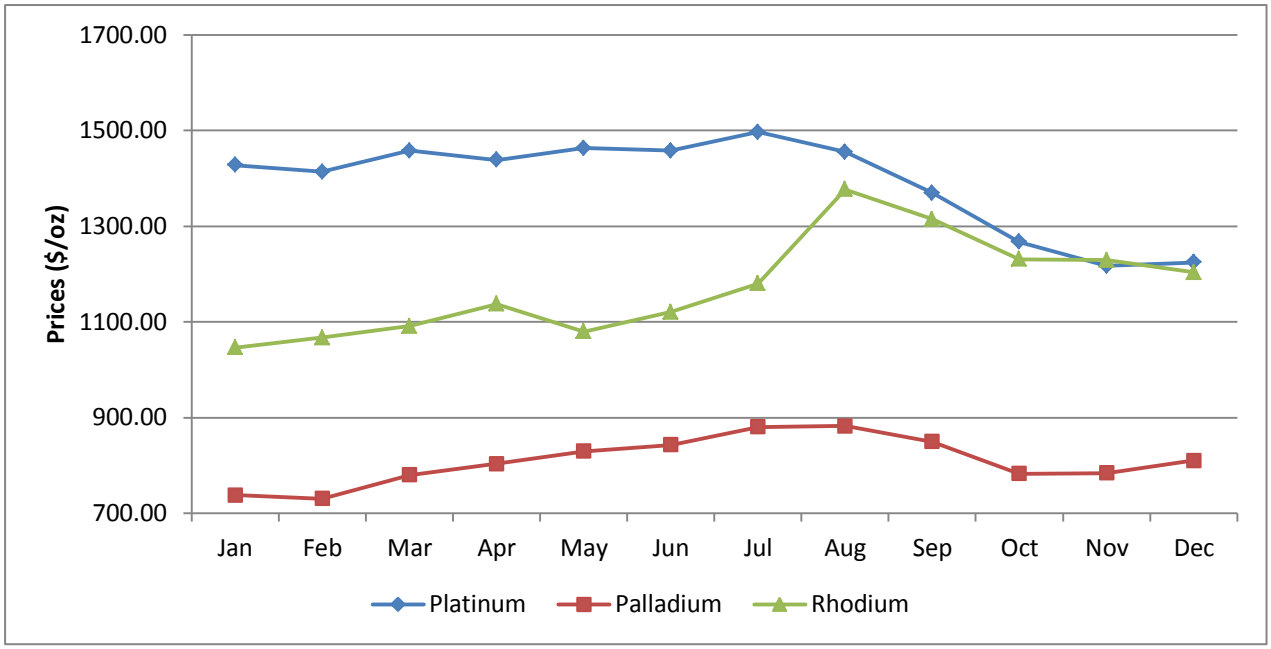
The Gold Fields Mineral Survey (GFMS) Platinum, Palladium Survey 2015 and PGM Market Report, agree that the palladium market was also under-supplied in 2014, with the latter quoting a figure of 57 t, while the 86 t of metal recovered from recycling could not help ensure a balanced market. Auto catalysts demand reached yet another record, increasing by 5.6 percent to 229 t, according to the PGM Market Report, while jewellery demand continued to decline as a result of slower economic growth in China, falling to 9 t from 11.1 t in 2013. Physical investment demand for palladium recovered from a liquidation of 0.2 t in 2013 to 29 t as a result of new ABSA and Standard Bank palladium ETFs launched in SA in March 2014. The rhodium market remained close to balance in 2014, with 26 t of auto catalyst demand partly accounted for by the 10 t recovered from recycling.

The majority of refined SA PGMs production was sold to a diverse range of customers across various global destinations, mostly Asia and Europe, the largest markets in terms of catalytic converters and jewellery industries. Smaller portions were consumed locally, almost entirely by the catalytic converters industry and in North America by industrial applications.

PRICES AND REVENUE

In 2014, PGMs prices were expected to draw strength from concerns over supply from SA after a 5-month long labour dispute. While this was the case for palladium and rhodium, the opposite was true for platinum, despite a drastic reduction in primary supply. Ample above-ground stocks, particularly in key consumer Europe, as well as increased amount of scrap metal, kept the platinum price lower than was expected. The monthly average price remained relatively flat at just over $1 400/oz during the first half of the year, before giving a glimmer of hope in July when it hit the $1 500/oz mark (Figure 19). By the end of 2014, the platinum price per ounce had lost $170 and averaged $1 391, 6.8 percent less than in 2013 (Table 23).

FIGURE 19: PGMs MONTHLY AVERAGE PRICES, 2014.



Source: Johnson Matthey London Base Prices.

TABLE 23: LONDON BASE PRICES OF PGMs, 2014.

($/oz)	**Pt**	**Pd**	**Rh**
Opening Price	1 395	726	1 000
Closing Price	1 225	811	1 203
Losses/Gains	-170	85	203
2014 Average Price	1 391	809	1 173
2013 Average Price	1 492	*643*	*1 284*
% Change (Ave. Price)	-6.8	25.8	-8.6

Source: Johnson Matthey London Base Prices.

The monthly average price of palladium was on the rise from March 2014 and reached record highs above $900 in August 2014, largely as a result of concerns over SA and Russian supplies, with the latter effected by sanctions of the country over its Ukrainian shenanigans. A slowdown in European and Japanese economies, as well as increased supplies from SA after the strike, put a downward pressure on prices for the remainder of the year. Still, palladium gained $85 in 2014, with its average price increasing by 25.8 percent when compared with 2013. Rhodium gained $203 for the year on the back of improved automotive demand from China, but still averaged 8.6 percent less than in 2013.

An increase in the average palladium price resulted in a 6.9 percent increase in SA's sales value in 2014 (Table 22), despite a 13.2 percent decrease in sales mass. However, total sales value for all PGMs decreased by 8.0 percent in line with a reduction in output and prices.

KEY DEVELOPMENTS

The 5-month long labour dispute during the first half of 2014 headlined SA's PGMs industry and once more brought mechanization closer to reality as the preferred future mining method. While it was the major producers that were hardest hit by the strikes, others continued to make progress in terms of new mine developments, acquisitions and exploration, in anticipation of improved future market conditions.

Amplats announced plans to sell its Union and Rustenburg operations, as well as exit its Pandora and Bokoni joint ventures (JV), as a way of avoiding high labour costs and high risk industrial relations. The

company plans to focus more on the mechanized Mogalakwena mine in Limpopo, a large open cast operation that could produce 600 koz in future, replacing output that Amplats could lose from selling Rustenburg operations. A number of potential buyers have shown interest in operations put up for sale.

To further emphasize the departure from labour intensive mining, SA's newest, fully mechanized platinum mine, Northam's Booysendal, began production in July 2014. Once in full production, by October 2015, the mine is expected to produce 160 koz of PGMs per annum. This has prompted the company to set a strategic review aimed at doubling platinum output to 1 Moz per annum by 2020.

The current operating climate in the PGMs industry prompted Aquarius Platinum to place its non-core assets on sale. Subsequent to that, Northam completed the purchase of the Aquarius' mothballed Everest mine, which is expected to ramp up to full production output of 250 koz of PGMs per annum by about 2018, adding approximately 50 percent to Northam's current annual production. The deal is expected to further increase Northam's exposure to mechanized, shallow mining. Everest mine is adjacent to Booysendal mine and for that reason it is to be renamed Booysendal South.

Ivanhoe Mine's Platreef project in Limpopo province completed its pre-feasibility study in 2014, which confirmed the technical viability of a low cost, large, mechanized underground mine and associated infrastructure that would produce more than 400 koz 4E, along with 19 million pounds (lb) nickel and 12 million lb copper annually. The first concentrate is not expected until 2019 and at an annual production rate of 4 Mt, Platreef is expected to be sustainable for 31 years. By end-2014, the project employed more than 650 people, and would require a further 1 500 over the first four years of operation.

Wesizwe Platinum continued to make progress on its core project, the Bakubung Platinum mine in the North West province. By the end of 2014, the main and ventilation shafts had already been sunk at the mine, with the intersection of the Merensky reef about 11 m away the level of the main shaft. The latter would be developed to 970 m depth by October 2015 and would have a hoisting capacity of 255 kt of ore and 15 kt of waste a month. The project, which is already more than 2 years ahead of schedule, will have a life span of 30 years and will, at steady state, produce 420 Moz 4E per annum. Main commissioning is scheduled for the fourth quarter of 2018 and once full production is achieved, the mine is expected to employ over 3 000 people.

Even though some projects are progressing well on the western limb of the Bushveld Complex, evidence suggests that future mining focus could be shifting from the labour intensive operations on the western limb to the northern limb. The latter is considered well-suited to mechanized mining operations because of its relatively thicker platinum-bearing reefs and as such is considered the focal point of future new mines development. While progression towards greater mechanization would inevitably be aligned with job losses, it could also result in larger manufacturing and beneficiation sectors and stable production volumes. As a result, the loss of unsafe low-paying jobs could be offset by skills improvement and the creation of safer, higher-paying jobs.

EMPLOYMENT

Average employment in the PGMs industry declined by 1.9 percent to 188 429 in 2014 due to retrenchments (Table 24). Total remuneration decreased by 4.1 percent due to the strikes in the first half, resulting in a 2.3 percent reduction in the average remuneration per employee. Average productivity per employee fell by 27.5 percent to 1.0 kg.

TABLE 24: EMPLOYMENT (INCLUDING CONTRACTORS) AND REMUNERATION IN SOUTH AFRICA'S PGM MINES, 2014.

YEAR	AVERAGE NUMBER OF EMPLOYEES	TOTAL REMUNERATION (R'000 000)	AVERAGE REMUNERATION (R/employee)
2010	182 003	26 577	146 027
2011	194 979	30 413	155 980
2012	197 847	34 409	173 917
2013	192 051	37 210	193 750
2014	188 480	35 677	189 292

Source: DMR, Directorate Mineral Economics

OUTLOOK

Global supplies of PGMs are expected to increase substantially in 2015 due to increased production from SA after the strike-halted production in 2014. Platinum and rhodium supplies are expected to increase in line with increased production from SA, while palladium supply related worries remain on the back of sanctions against Russia, the largest supplier of the metal. Demand for the metals is forecast to rise, particularly from the automotive sector due to tighter emissions legislation in Western Europe and an increase in the manufacture of vehicles. Platinum demand is expected to be further boosted by increased jewellery demand, with growth expected in China, the US, India and Western Europe. However, a combination of increased mining supply from SA and recycling growth is not expected to meet the forecast growth in the metals' demand, which could propel prices to modestly higher levels.

REFERENCES

1. *DMR, Directorate Mineral Economics.*
2. *GFMS Platinum and Palladium Survey 2015.*
3. *PGMs Market Report 2015, Johnson Matthey plc.*
4. *WPIC Platinum Quarterly Q1 2015.*
5. *www.ivanhoemines.com/s/platreef.asp*
6. *www.northernminer.com, 14 January 2015.*
7. *www.mining.com, 08 January 2015.*
8. *www.miningweekly.com, 08 January 2015.*
9. *www.mineweb.com, 20 February 2015.*
10. *www.mimingweekly.com, 11 December 2014.*
11. *www.bdlive.co.za, 27 October 2014.*
12. *www.timeslive.co.za, 21 September 2014.*
13. *www.miningmx.com, 14 August 2014.*
14. *www.bdaylive.co.za, 21 July 2014.*
15. *www.bdaylive.co.za, 14 April 2014.*

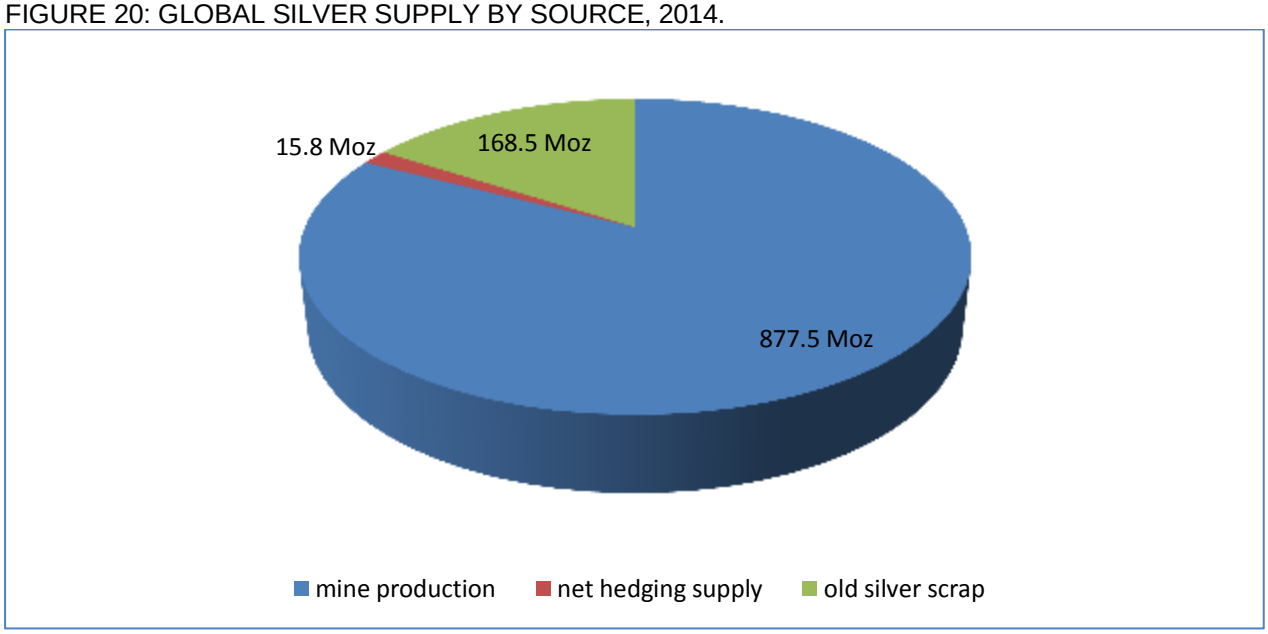
SILVER

DO Moumakwa

SUPPLY AND DEMAND

According to Gold Fields Mineral Survey (GFMS), global silver supply reached its highest level since 2010, increasing by 6.1 percent from 1 000.5 million ounces (Moz) in 2013 to 1 061.8 Moz in 2014. CPM, in the Silver Yearbook 2015, puts the 2014 supply figure at 996.9 Moz, an increase of 1.0 percent from its 2013 figure of 987 Moz. However, they both attribute the increase to higher mine output, which GFMS notes increased by 5 percent year-on-year to reach a record high of 877.5 Moz (Figure 20), while secondary supply, comprising scrap and net hedging supply, accounted for 184.3 Moz. Mexico remained the world's largest mine producer with 193 Moz, followed by Peru and China with 121.5 Moz and 114.7 Moz, respectively.

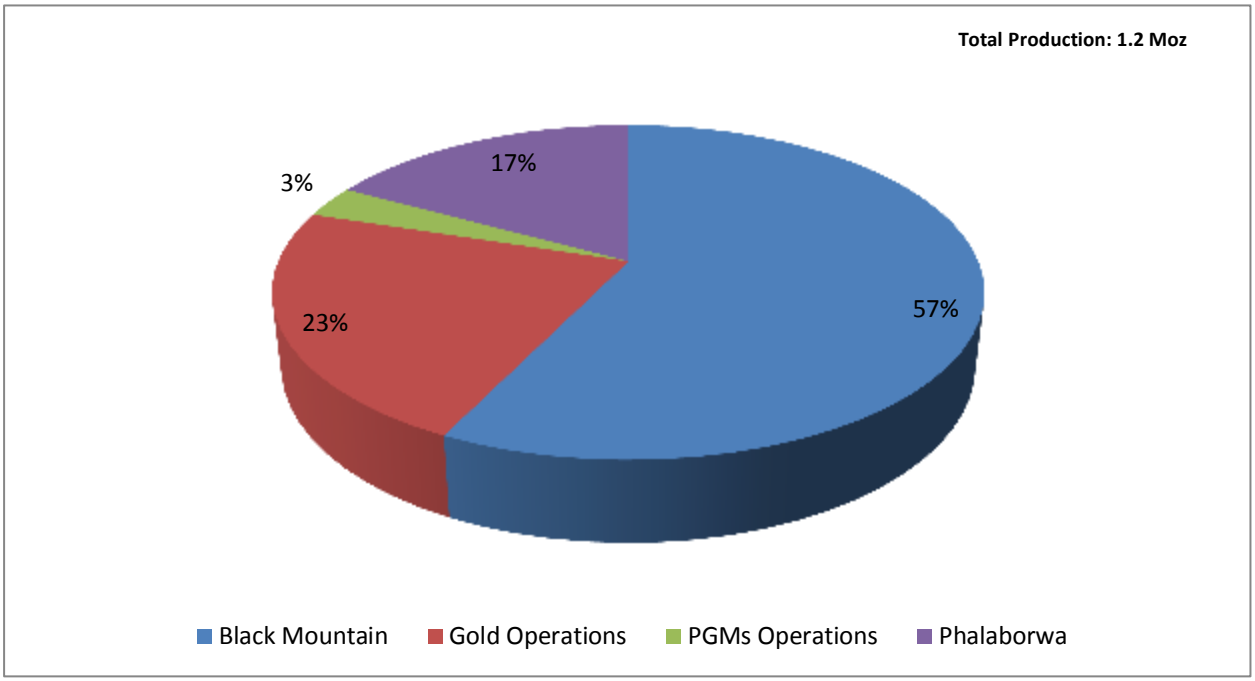
FIGURE 20: GLOBAL SILVER SUPPLY BY SOURCE, 2014.



Source: GFMS, Silver Survey 2015.

SA's silver production in 2014 decreased by 45.7 percent to 1.2 Moz, mainly as a result of reduced grades from copper and lead operations. The metal was produced as a by-product derived from 9 gold operations, 2 platinum group metals (PGMs) operations, 1 copper operation (Phalaborwa) as well as 1 lead and copper operation, namely Black Mountain. Combined production from Black Mountain as well as gold operations accounted for approximately 80 percent of total production (Figure 21). Local and export sales declined by 28.9 and 10.7 percent, to 138 koz and 1.8 Moz, respectively, in line with a decline in production.

FIGURE 21: SOUTH AFRICA'S SILVER PRODUCTION BY SOURCE, 2014.



Source: Directorate Mineral Economics.

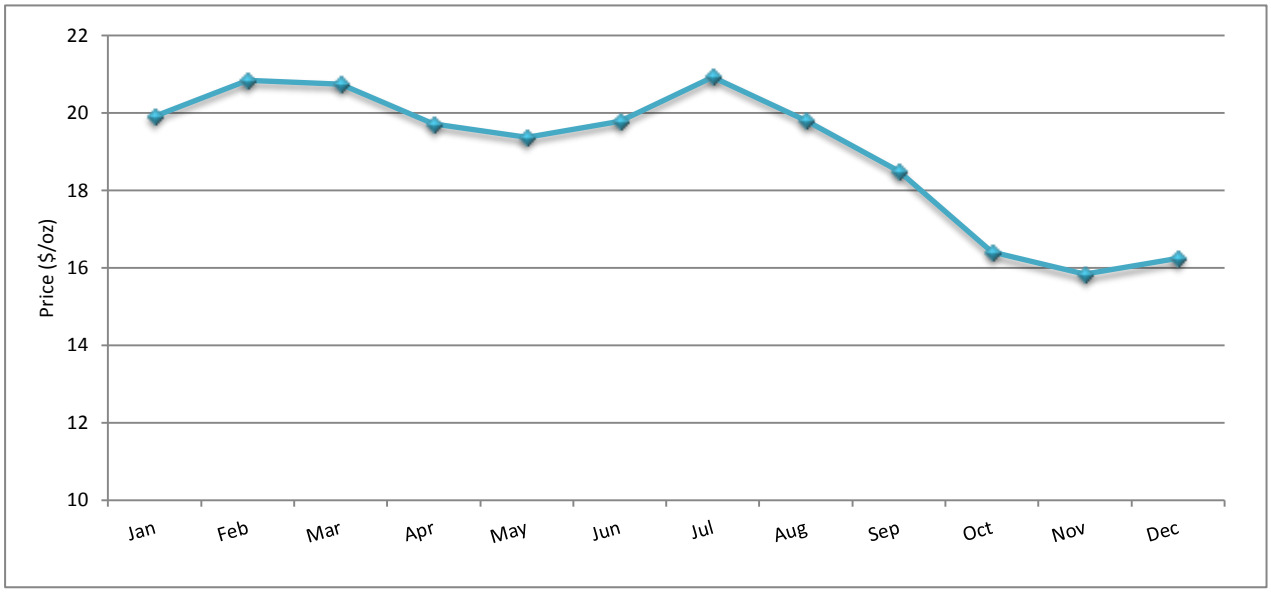
Total physical demand for silver decreased by 4 percent year-on-year to 1 066.7 Moz in 2014, according to GFMS, despite an increase in fabrication demand noted by CPM. The lower demand is attributed to a decline in retail investment, which offset gains from jewellery fabrication and silverware sectors. CPM notes that investment demand fell by 12.6 percent to 131.6 Moz in 2014, while fabrication demand, including jewellery, rose by 3.5 percent to 865.3 Moz. Despite lower physical demand, GFMS reckons the silver market remained in deficit in 2014 at 4.9 Moz, from 111.9 Moz in 2013. By contrast, and somewhat inexplicably, CPM determined that the market was oversupplied by 102.9 Moz.

PRICES AND REVENUE

According to World Silver Survey 2015, the silver price movements in 2014 were affected by mainly two factors, the US quantitative easing and concerns over China's ability to drive growth via domestic consumption. During the first half of the year, monthly average silver prices were fairly constant between $19.00/oz and $21.00/oz (Figure 22), reaching their highest level for the year, $22.16/oz, on February 24. During this period, the metal was buoyed by gold's political risk support involving Russia's annexation of Crimea, growing tensions in the west and more positive data releases from China.

After July, however, increased speculation that the Eurozone would introduce more quantitative easing resulted in substantial strengthening of the US dollar, which ultimately became partly responsible for the downward spiral of the metal's prices. By the end of the year the metal had lost 19.9 percent of its opening price and at $19.07/oz, its average was 19.8 percent lower than in 2013. SA's total revenue derived from the metal declined by 24.5 percent in line with a drop in total sales mass and prices.

FIGURE 22: MONTHLY AVERAGE SILVER PRICES, 2014.



Source: LBMA.

OUTLOOK

Silver supply is expected to decrease or, at best, remain flat in 2015 as a projected increase in mine supply is likely to be offset by a drop in secondary supply. SA mine production is also expected to increase, mainly as a result of increased output from PGMs mines after a 5-month strike in 2014. Demand from the largest end-user of the metal, jewellery, is projected to increase in 2015 as Indian jewellery fabrication continues to grow. As a result, prices are expected to consolidate above $16.00/oz, further spurred on by the flourishing US economy and strengthening dollar. However, the projected average price is still expected to be significantly lower than the 2014 average.

REFERENCES

1. *DMR, Directorate Mineral Economics.*
2. *CPM Silver Yearbook 2015.*
3. *GFMS World Silver Survey 2015.*
4. *www.bulliondesk.com, 29 April 2015.*
5. *www.mineweb.com, 01 May 2015.*

ENERGY MINERALS OVERVIEW

KL Revombo

INTRODUCTION

South Africa's coal and uranium resources are ranked among the top ten in the world. In 2014, the country has the 5th largest coal reserves in the world and is the 7th largest coal producer. The country's uranium resources are the 7th largest in the world whereas uranium production is ranked 11th. In South Africa uranium is produced mainly as a by-product from the treatment gold-bearing ores. The country's coal reserves are located mainly in Mpumalanga, northern Kwazulu-Natal and Limpopo provinces.

The country hosts very small deposits of oil and gas, but potentially hosts large quantities of shale gas in the Karoo basin. The country imports more than 60 percent of the feedstock required for liquid fuel production with the remainder derived from synthetic fuels, which are produced domestically from coal and natural gas.

PRODUCTION AND SALES

In 2014, global oil production increased by 2.3 percent or 2.1 million barrels per day (mbpd) to 88.7 mbpd from 86.6 mbpd in 2013. Production outside OPEC grew by 2.1 mbpd whereas OPEC output declined 0.3 percent to 36.6 mbpd. Declines in Libya and Angola were offset by gains in Iraq, Saudi Arabia and Iran.

Global oil consumption grew by 0.8 mbpd in 2014, significantly lower than the 1.4 mbpd in 2013. Non-OECD countries accounted for all the net growth in global consumption. OECD consumption declined by 1.2 percent. China recorded the largest increment to global oil consumption of 390 thousand barrels per day (tbpd) whilst Japan recorded the largest drop of 220 tbpd. Oil prices averaged $98.95 per barrel in 2014, a decline 8.94 percent from $108.66 per barrel in 2013.

World natural gas production grew by 1.6 percent to 3 460.6 billion cubic metres (bcm) in 2014 from 3 408.8 bcm in 2013. United States of America's 728.3 bcm was the world's largest production, followed by Russia's 578.7 bcm and Qatar's 177.2 bcm. Countries that recorded the largest increases were Myanmar, Turkmenistan and Libya, with growths of 28.6 percent, 11.1 percent and 10.9 percent respectively. The world's largest volumetric increase was the US's 6.1 percent whereas the largest volumetric declines were Russia's 4.3 percent and the Netherlands' 18.7 percent. Global gas consumption grew by 0.4 percent to 3 393 bcm in 2014 compared with 2013's 3 381 bcm. Consumption in the European Union (EU) experienced its largest volumetric and percentage decline of 11.6 percent (51 bcm). Slovakia, Greece and Ukraine recorded the largest declines of 30.6 percent, 23.5 percent and 15.7 percent respectively. The average Henry Hub Natural gas prices increased by 17.79 percent to $4.39/Btu in 2014 from $3.73/Btu in 2013 boosted mainly by the marginally increased global demand for natural gas.

Despite the global coal consumption growing by 0.4 percent to 7 923.2 Mt in 2014, its share of global primary energy consumption fell to 30 percent. Consumption outside the OECD grew by 1.1 percent, the weakest growth since 1998, driven by a flattening of Chinese consumption. The largest volumetric declines were recorded by Ukraine (20.2 percent) and UK (20.3 percent). India recorded the world's largest volumetric increase (11.1 percent). OECD consumption fell by 1.5 percent, led by 6.5 percent drop in the European Union. Global coal production decreased by 0.7 percent to 8 164.9 Mt in 2014. Coal prices continued with the downward spiral that started in 2012 owing to the oversupply.

World uranium mine production declined by 6 percent from 59.7 ktU in 2013 to 56.3 ktU in 2014 (Table 25). The largest decline at 24.6 percent was from Namibia, followed by Australia's 21.2 percent and Ukraine's 10.5 percent. At 41.1 percent; Kazakhstan dominated word output, followed by Canada's 16.2 percent and Australia's 8.89 percent. In 2014, Africa's contribution to Uranium mining was from Namibia, Niger, South Africa and Malawi. Africa accounted for 14.8 percent of global output. At present, about 42 percent of uranium comes from conventional mines, about 51 percent from in situ leach, and seven percent is recovered as a by-product from other mineral extraction. The average uranium price decreased by 13.21 percent from $38.58 /lb in 2013 to $33.48 /lb in 2014.

TABLE 25: SOUTH AFRICA'S PRODUCTION AND SALES OF ENERGY COMMODITIES, 2014

COMMODITY	YEAR	PRODUCTION	LOCAL SALES		EXPORT SALES		TOTAL SALES	
		kt	kt	R'000	kt	R'000	kt	R'000
Coal	2013	256 119	183 449	49 447 281	73 178	50 911 117	256 627	100 358 398
	2014	261 399	183 013	54 924 215	75 427	50 881 592	258 439	105 805 807
Uranium	2013	0.63	*	*	*	*	*	*
	2014	0.67	*	*	*	*	*	*
Subtotal	2013	256 120	183 449	49 447 281	73 178	50 911 117	256 627	100 358 398
	2014	261 399	183 013	54 924 215	75 427	50 881 592	258 439	105 805 807
Natural Gas	2013	660	660	1 755 972	-	-	660	1 755 972
	2014	849	849	2 312 725	-	-	849.16	2 312 725
Natural Gas Condensate	2013	61	61	705 006	-	-	61	705 006
	2014	89	89	1 059 806	-	-	89	1 059 806
Subtotal	2013	721	721	2 460 977	-	-	721	2 460 977
	2014	938	938	3 372 531	-	-	938	3 372 531

Source: DMR, Mineral Economics Directorate

In 2014, South Africa's annual saleable coal production increased by 2.07 percent to 261.4 Mt from 256.1 Mt in 2013 while uranium production increased to 0.67 kt from 0.63 kt in 2013 (Table 25). The country's natural gas production grew by 28.7 percent to 849.2 kt from 659.6 kt in 2013 whereas natural gas condensate increased by 45.1 percent to 88.8 kt. There was no crude petroleum production in 2014, as a result of the shutdown at PetroSA's Oribi plant. Seventy percent of the coal produced was sold locally whilst 30 percent was exported. All the uranium produced was exported and all the natural gas and condensate were also sold locally. Coal export volumes increased by 3 percent to 75.4 Mt compared with 2013.

EMPLOYMENT

Employment in the energy sector fell by 2.04 percent from 89 055 in 2013 to 87 235 in 2014 (Table 26). The jobs in this sector were dominated by the coal industry which accounted for about 98.9 percent of the total jobs with both the crude oil and natural gas accounting for the remainder. Total remuneration increased by 8.52 percent to R20.8 billion and the average annual earnings grew by 10.8 percent to R238 400 per employee.

TABLE 26: EMPLOYMENT AND GROSS REMUNERATION ON MINES AND PLANTS IN THE SOUTH AFRICAN ENERGY INDUSTRY, 2005 – 2014

YEAR	EMPLOYEE	REMUNERATION	
	Number	R'000	R'000/Employee
2005	57 185	6 558 129	114.7
2006	57 936	7 340 151	126.7
2007	60 698	8 778 627	144.6
2008	65 739	11 138 368	169.4
2009	70 970	12 947 469	182.4
2010	75 021	14 352 946	191.3
2011	78 761	16 242 879	206.2
2012	83 538	17 612 592	210.8
2013	89 055	19 163 272	215.2
2014	87 235	20 795 751	238.4

Source: DMR, Mineral Economics Directorate

OUTLOOK

The downward trend on coal prices that started in mid-2011 continued through to 2014. This pressure was further exacerbated by the global glut and the week demand during 2014. In 2015, South Africa's coal consumption is set to increase because of the additional coal that is due to unit 6 of Medupi power station coming online. The country's coal production is forecast to increase by one percent to reach 264 Mt in 2015.

The country will continue to import gas and crude oil to meet its liquid fuel requirements which are also partially met by Sasol's coal-to-liquid technology. South Africa's natural gas production is forecast to remain at current levels in 2015 as PetroSA is still busy with the drilling project in the F-O field, also known as Project Ikhwezi. While there is a possibility of shale gas breakthrough, exploratory fracking is still needed to determine the commercial prospects of shale gas. The country's gas industry future may be boosted by shale gas in future as recent improvements in exploration technologies, coupled with the need for South Africa to diversify its energy mix has seen increased interest in exploration activity off South Africa's coast, with 20 exploration licenses issued. Even though gas infrastructure and production are limited, the country has some experience in this sector and would be capable of ramping up the level of expertise required to manage the creation of a domestic gas industry.

There are no major changes expected in the country's uranium industry in 2015. The Integrated Resource Plan 2010 (IRP 2010) has committed a nuclear fleet of 9 600 MW by 2030. This is going to increase nuclear's contribution from 5 to 20 percent towards the country's energy mix. This increase in nuclear energy contribution will boost the country's nuclear industry.

REFERENCES

1. *BP Statistical Review of World Energy, June 2015*
2. *Department of Mineral Resources, Mineral Economics Directorate*
3. *Coal Information 2015, International Energy Agency – OECD/IEA, 2015*
4. *Shale gas and its implications for Africa and African Development Bank, 2013 African development Bank*

COAL

KL Revombo

SUPPLY AND DEMAND

At the end of 2014 global proven coal reserves totalled 891 531 Mt. The United States of America (USA) hosted the largest coal reserves, accounting for 26.6 percent of the global total, followed by Russia (17.6 percent) and China (12.8 percent). Ranked fifth globally, South Africa accounted for 7.5 percent of these reserves. (Table 27).

Global coal production decreased by 0.7 percent from 8 230.7 Mt in 2013 to 8 164.9 Mt in 2014 (Table 27). The largest volumetric declines of 2.6 percent (100 Mt) and 29 percent (24.7 Mt) were recorded in China and Ukraine respectively. India's 6.4 percent (38.8 Mt) and Australia's 4.71 percent (20.7 Mt) were the largest recorded volumetric growths in production in 2014. Despite a 2.6 percent decrease, China remained the largest producer, contributing 3 874 Mt to world total production, followed by the USA (906.9 Mt), India (644 Mt), Australia (491.5 Mt) and Indonesia (458 Mt).

TABLE 27: WORLD COAL RESERVES, PRODUCTION AND EXPORTS, 2014

COUNTRY	RESERVES[1]			PRODUCTION[1]			EXPORTS[2]			CONSUMPTION[2]		
	Mt	%	Rank	Mt	%	Rank	Mt	%	Rank	Mt	%	Rank
Australia	76 400	8,6	4	491,5	6,0	4	375	27,1	2	115,5	1,5	7
Canada	6 582	0,7	11	68,8	0,8	11	34,5	2,5	7	42,4	0,5	11
China	114 500	12,8	3	3 874	47,4	1	-	-	-	3 910	49,3	1
Colombia	6 746	0,8	10	88,6	1,1	10	80,3	5,8	5	7,3	0,1	12
India	60 600	6,8	6	644,0	7,9	3	1,2	0,1	11	906,5	11,4	2
Indonesia	28 017	3,1	9	458,0	5,6	5	410,9	29,7	1	61,7	0,8	9
Kazakhstan	33 600	3,8	8	108,7	1,3	9	28,9	2,1	8	86,7	1,1	8
Poland	5 465	0,6	12	137,1	1,7	8	9,1	0,7	9	137,0	1,7	6
Russia	157 010	17,6	2	357,6	4,4	6	155,5	11,2	3	201,4	2,5	4
South Africa*	66 700	7,5	5	260,6	3,2	7	75,4	5,4	6	183,0	2,3	5
Ukraine	33 873	3,8	7	60,9	0,7	12	5,6	0,4	10	56,8	0,7	10
USA	237 295	26,6	1	906,9	11,1	2	88,3	6,4	4	835,4	10,5	3
Other	64 743	7,3	-	708,3	8,7	-	118,9	8,6	-	1 380	17,4	-
Total	**891 531**	**100,0**	-	**8 164,9**	**100**	-	**1 383,6**	**100**		**7 923,2**	**100,0**	-

Source: [1]*BP Statistical Review of World Energy, June 2015*
[2]*Coal Information 2015, International Energy Agency – OECD/IEA*
**DMR, Mineral Economics Directorate – reserves, production and exports figures*

The Organization for Economic Co-operation and Development (OECD) countries' coal production grew by 1.06 percent from 2 024.9 Mt in 2013 to 2 046.4 Mt in 2014. Non-OECD countries which include China, Russia, Indonesia, Kazakhstan, India and Colombia, reported a production decline of 1.4 percent to 6 118.5 Mt from 6205.8 Mt in 2013.

Regardless of the number of coal producing mines decreasing from 95 to 93 in 2014, South Africa's total run-of-mine (ROM) production increased by 2.05 percent from 331.5 Mt in 2013 to 338.3 Mt in 2014, owing to brownfield developments. Opencast mining accounted for 63.08 percent of ROM production, followed by board and pillar's 34.90 percent, stooping's 1.52 percent and longwall at 0.51 percent. Similarly to ROM, saleable coal production increased by 2.07 percent to 261.4 Mt from 256.1 Mt in 2013 (Table 28). In 2014, the major producers that accounted for 74.23 percent of the country's saleable coal production included; Anglo Coal, Glencore, Exxaro, SASOL and South32 (formerly BHP Billiton Coal South Africa (BECSA)). Junior coal producers accounted for the remaining 25.77 percent. The four largest Black Economic Empowerment (BEE) companies, namely, Exxaro Resources, Optimum Coal Holdings, Umcebo Mining and Shanduka Coal, accounted for 24.03 percent from 25.6 percent in 2013 of the country's total saleable

production. Overall, BEE companies and junior coal miners accounted for about 40.77 percent from 41.5 percent in 2013 of South Africa's total saleable production.

TABLE 28: SOUTH AFRICA'S PRODUCTION AND SALES OF SALEABLE COAL, 2005 – 2014

		LOCAL SALES			EXPORT SALES		
YEAR	PRODUCTION	MASS	VALUE (FOR)		MASS	VALUE (FOB)	
	Mt	Mt	R'000	R/t	Mt	R'000	R/t
2005	245	173,4	14 878 140	86	71,4	14 472 904	296
2006	244,8	177,0	16 245 861	92	68,7	21 155 176	316
2007	247,7	182,8	19 718 642	108	67,7	21 745 322	361
2008	252,7	197,0	30 104 161	153	60,6	44 706 204	737
2009	250,6	184,7	34 463 054	187	60,5	30 934 920	512
2010	257,2	186,4	33 702 229	181	66,8	37 477 184	561
2011	250,7	177,9	37 253 525	209	68,8	50 548 678	735
2012	258,6	185,7	43 921 277	237	76,0	52 226 904	687
2013	256,1	183,4	49 447 281	270	73,2	50 911 117	696
2014	261,4	183,0	54 924 215	300	75,4	50 881 592	675

Source: Mineral Economics Directorate, DMR

Despite the 3.4 percent drop from 61.7 percent to 58.27percent in total coal production of the Witbank coalfield in 2014, it remained the largest producer, followed distantly by Highveld's 20.88 percent, Waterberg's 7.24 percent, and Sasol-Vereeniging's 7.08 percent. The Waterberg, Vryheid, Sasol-Vereeniging, Utrecht and Soutpansberg coalfields' percentage production were lower compared to 2013, while the Highveld, Ermelo and three of Kwazulu-Natal's coalfields (Utrecht, Nongoma and Klip River) improved their production in 2014. The Mpumalanga Central basin, which comprises Witbank, Highveld and Ermelo coalfields, accounted for 83.88 percent of the country's total production, a slight increase compared to 83.5 percent in 2013.

South Africa's anthracite production, which accounted for 1.35 percent of the country's overall production, slowed by 2.89 percent to 3.52 Mt in 2014 from 3. 62 Mt in 2013 (Table 29).

TABLE 29 SOUTH AFRICA'S PRODUCTION AND SALES OF ANTHRACITE, 2005 – 2014

		LOCAL SALES			EXPORT SALES		
YEAR	PRODUCTION	MASS	VALUE (FOR)		MASS	VALUE (FOB)	
	kt	kt	R'000	R/t	kt	R'000	R/t
2005	1 640	715	294 454	412	524	193 634	369
2006	1 584	821	374 113	455	672	258 063	384
2007	2 348	975	473 998	486	910	405 109	445
2008	2 207	961	581 207	604	1 265	762 064	602
2009	1 658	786	549 620	699	598	517126	863
2010	2 074	1 197.7	933 123	779	874	717 086	821
2011	2 554	1 259.4	1 127 675	895	983	892 137	907
2012	3 005	1 520.5	1 455 444	957	1 227	1 179 215	961
2013	3 621	1 763.1	1 627 462	923	1 141	1 025 465	899
2014	3 517	1 917.9	1 888 234	985	2 178	1 588 858	730

Source: Mineral Economics Directorate, DMR

Bituminous coal production, which accounted for 98.65 percent of South Africa's total saleable coal production, increased by 1.95 percent to 257.9 Mt compared with 2013 (Table 30).

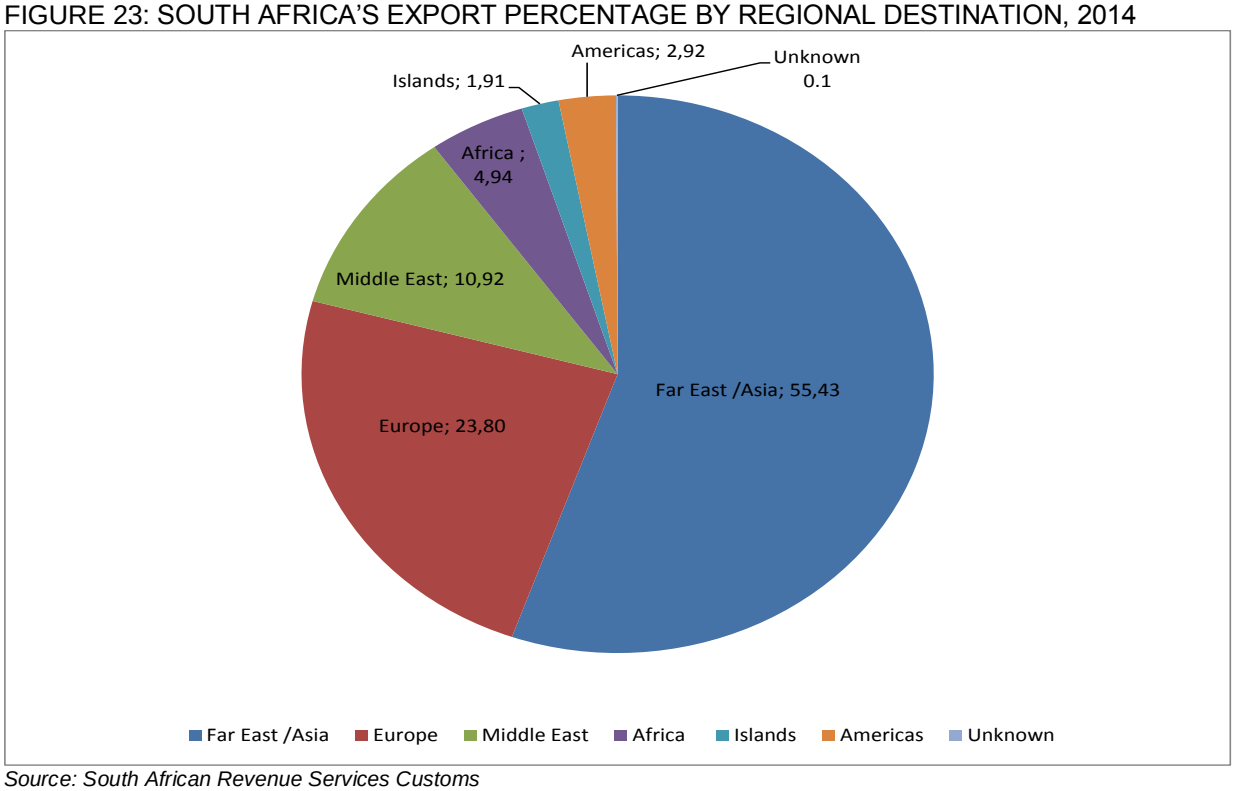
TABLE 30: SOUTH AFRICA'S BITUMINOUS COAL PRODUCTION AND SALES, 2005 – 2014

YEAR	PRODUCTION	LOCAL SALES			EXPORT SALES		
		MASS	VALUE (FOR)		MASS	VALUE (FOB)	
	Mt	Mt	R'000	R/t	Mt	R'000	R/t
2005	243.3	172.7	14 583 685	84	70.9	20 961 542	296
2006	244.8	176.2	15 871 748	90	68.1	21 477 286	315
2007	245.3	181.8	19 244 643	106	66.7	24 042 564	360
2008	250.5	196.1	29 522 953	151	59.4	43 944 138	740
2009	248.9	183.9	33 913 433	184	59.9	30 417 794	508
2010	255.1	185.2	32 769 106	177	65.9	36 760 098	558
2011	248.2	176.6	36 125 849	205	67.8	49 656 540	732
2012	255.6	184.1	42 465 833	231	74.8	51 047 689	683
2013	252.9	182.2	47 975 553	263	73.4	50 788 019	692
2014	257.9	181.1	53 035 981	293	73.2	49 292 734	673

Source: Mineral Economics Directorate, DMR

In 2014, South Africa's coal exports grew by three percent to 75.4 Mt from 73.2 Mt in 2013. Bituminous coal exports dropped by 0.24 percent to 73.2 Mt, while anthracite exports surged by 91 percent to 2.18 Mt. Asian exports decreased for the second consecutive year, from 58 percent in 2013 to 55.43 percent in 2014 (Figure 23). Despite this decline, the continent continued to be the leading importer of South African coal, followed by Europe's 23.80 percent and Middle East's 10.92 percent. The Americas' import of the country's coal decreased from 5.0 percent in 2013 to 2.92 percent in 2014. Exports to Africa accounted for 3.83 percent of South Africa's total and Morocco accounted for about 35.68 percent of this total, followed distantly by Senegal's 13.65 percent and Kenya's 11.96 percent.

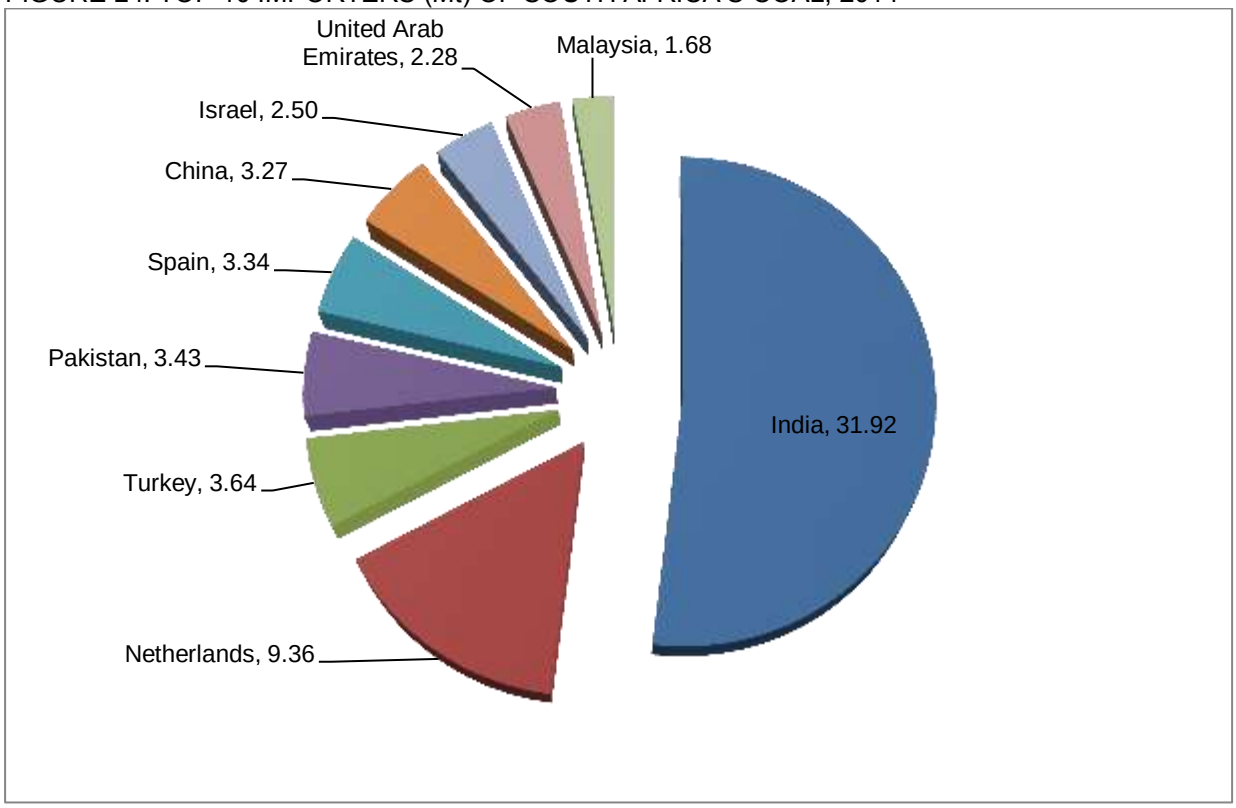
FIGURE 23: SOUTH AFRICA'S EXPORT PERCENTAGE BY REGIONAL DESTINATION, 2014



Source: South African Revenue Services Customs

India continued to be South Africa's leading customer by country, accounting for 31.92 Mt of the country's coal export sales, followed by Netherlands' 9.36 Mt and Turkey's 3.64 Mt. In 2014, China only imported 3.37 Mt of South Africa's coal (Figure 24).

FIGURE 24: TOP 10 IMPORTERS (Mt) OF SOUTH AFRICA'S COAL, 2014

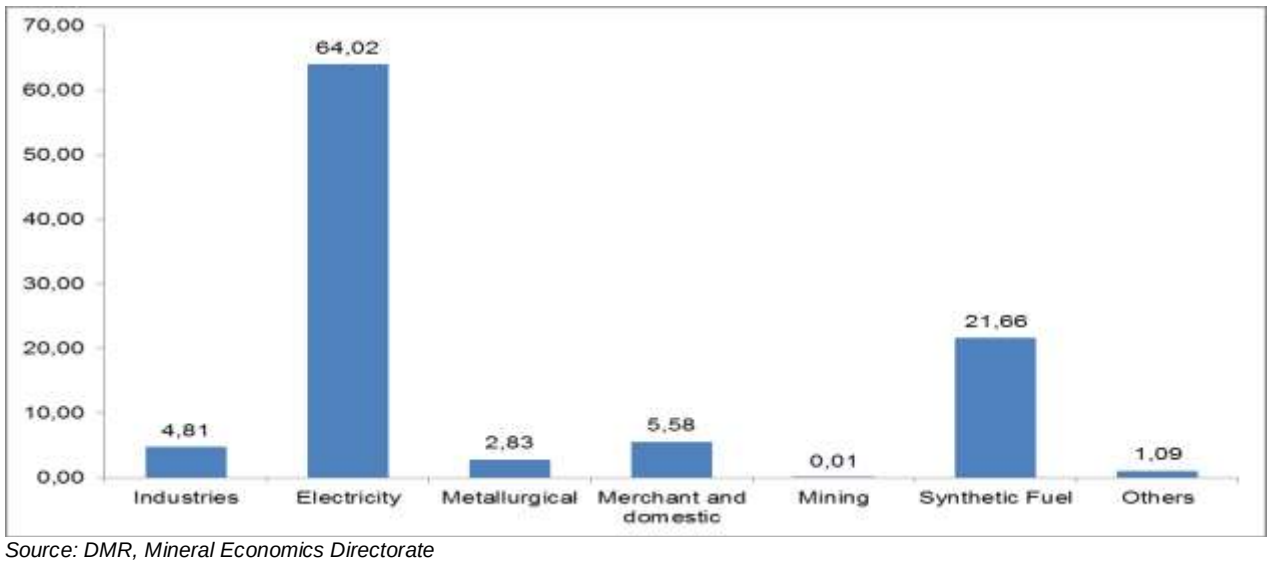


Source: South African Revenue Services Customs

Global coal consumption marginally decreased by 0.89 percent from 7 994.6 Mt to 7 923.2 Mt in 2014. China maintained its position as the leading coal consumer, accounting for 49.3 percent of the global total consumption followed distantly by India's 11.4 percent and USA's 10.5 percent. China, USA and India accounted for over 71 percent of the global coal consumption. OECD and non-OECD countries coal consumption decreased by 2.2 percent and 0.42 to 2 088.7 Mt and 5 834.5 Mt respectively, due to weaker demand.

South Africa's coal consumption decreased by 0.22 percent to 183.0 Mt in 2014 from 183.9 Mt in 2013. Bituminous coal's local sales volume dropped by one percent to 181.1 Mt, whereas anthracite local sales volumes rose by nine percent to 1.92 Mt due to increased demand from steel makers.

FIGURE 25: LOCAL COAL CONSUMPTION BY SECTOR (PERCENTAGE), 2014

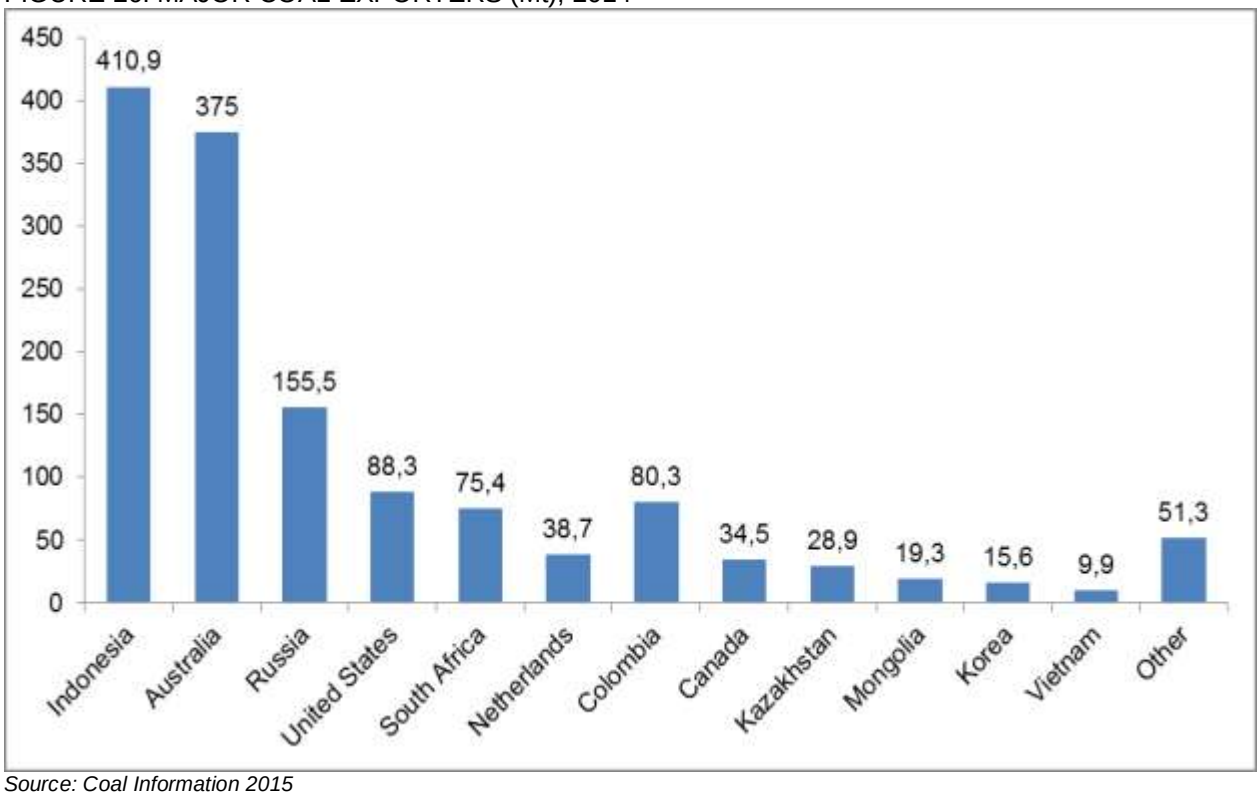


Source: DMR, Mineral Economics Directorate

The electricity sector continued to be the leading consumer of coal in the country, accounting for 64.02 percent (117.2 Mt) of the South Africa's coal consumption followed distantly by the Synthetic Fuel sector's 21.66 percent (39.64 Mt) and Merchant and Domestic's 5.58 percent (10.21 Mt) as depicted in Figure 25. In 2014, local industrial coal usage more than doubled to 8.81 Mt from 4.02 Mt in 2013.

In 2014, global coal trade increased by 1.47 percent to 2 807.2 Mt, as reported by International Energy Agency (IEA)'s Coal Information. Coal exports increased by 0.65 percent to 1 383.6 Mt whereas coal imports grew by 2.29 percent to 1 423 Mt. Indonesia continued to be the world's leading coal exporter with 410.9 Mt, followed by Australia's 375 Mt and Russia's 155.5 Mt (Figure 26). Australia and Russia increased exports by 38.9 Mt (11.6 percent) and 14.8 Mt (10.5 percent) respectively, while Indonesia's exports declined by 17 Mt (4 percent). Exports from the USA and Colombia remained relatively constant while exports from South Africa increased by three percent. Major importers were China (291.6 Mt), India (239.4 Mt) and Korea (187.1 Mt).

FIGURE 26: MAJOR COAL EXPORTERS (Mt), 2014



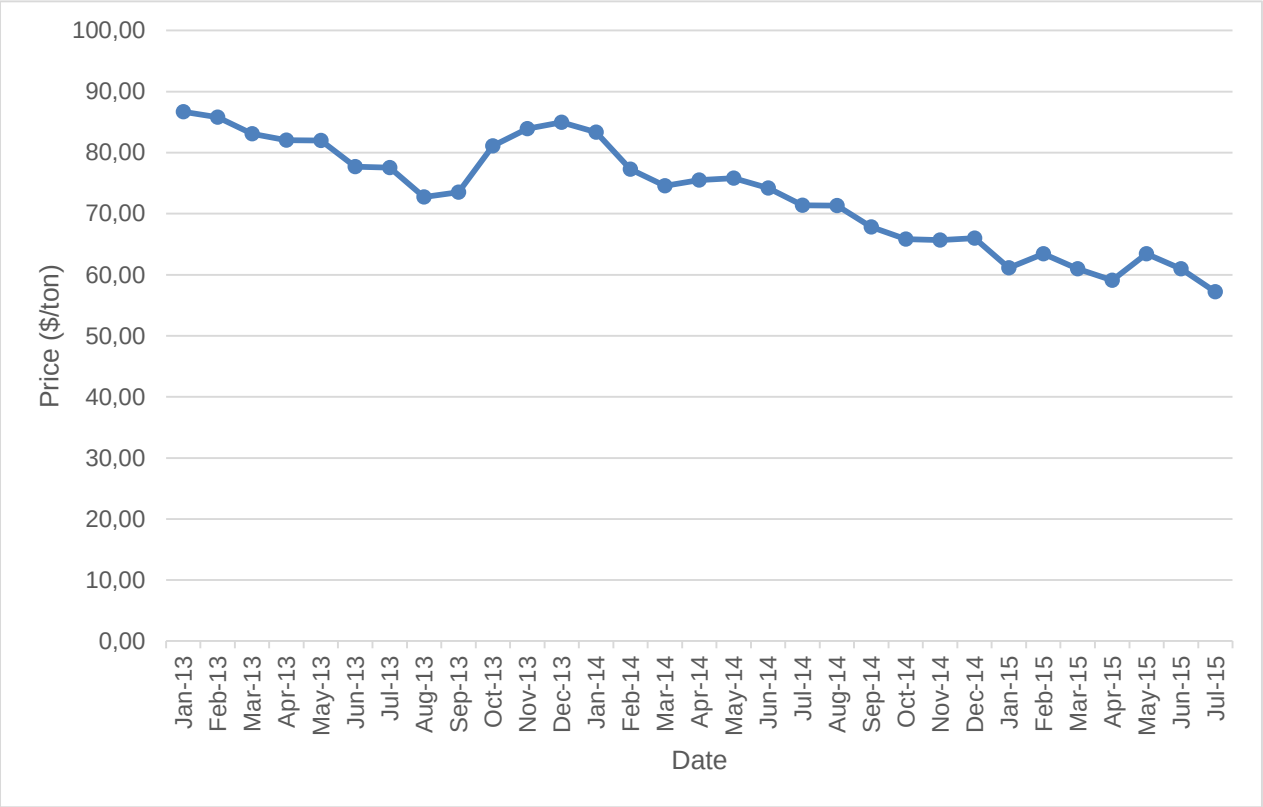
Source: Coal Information 2015
South Africa's Figure: DMR Mineral Economics Directorate

PRICES AND REVENUE

The glut and slump in coal demand that started in late 2012, persisting through 2013 continued into 2014. Coal prices remained depressed in 2014, with the average Richards Bay (FOB) export price decreasing by 10.53 percent from $80.92/t in 2013 to $72.39/t in 2014. However, the weaker rand absorbed the blow to some extent because in rands per ton (R/t), the average export price marginally increased by 0.52 percent from R779.89 /t to R783.95 /t as the rand depreciated by 12.29 percent to R10.84 /$ in 2014 from R9.65 /$ in 2013.

Coal prices started the year at $83.37 /t, decreasing to $74.59 /t in March due to diminished European demand, before it staged a minor resurgence in the following two months to reach $75.84 /t by May 2014 owing to India's increased demand of South Africa's coal (Figure 27). From June 2014 prices eased down on weak demand, especially from India and global coal glut, to settle at $65.98 /t by December 2014.

FIGURE 27: RBCT MONTHLY COAL PRICES, JANUARY 2013 – JUNE 2015



Source: Global Coal website (www.globalcoal.com)

Domestic coal prices increased by 11.04 percent from an average of R270.25 /t in 2013 to an average of R300.08 /t in 2014. Prices were boosted by the industrial sector which recorded an increase of more than 4 Mt in 2014.

Coal retained its status as the biggest revenue generator, accounting for R105.81 billion (27 percent) of the total mining revenue followed distantly by PGM's R77.50 billion and Gold's R63.35 billion. Local sales value grew by 11.1 percent to R54.92 billion from R49.45 billion owing to a higher unit value in 2014. Export sales, which earn the mining companies higher margins, recorded a decrease of 0.1 percent to R50.88 billion in 2014 from R50.91 billion in 2013 due to lower coal export prices.

KEY DEVELOPMENTS IN 2013/2014

In January 2014, IchorCoal, a German privately-held company announced that it will be pulling out of coal mining investments in Poland in favour of South Africa where it already invested in Vunene Mining where it has a 74 percent stake, and a 30 percent stake in Mbuyelo Coal. IchorCoal invested A$2.5 million in Universal

Eskom announced that it still has to plug the four billion tons (Bt) coal supply deficit it was facing from 2014 until 2040. Of the 4 Bt supply deficit, 1.97 Bt had already been contracted, with a shortfall of 2.1 Bt which was still to be secured. Eskom believes that 1.3 Bt of the 2.1 Bt can be sourced from new, black-owned companies.

Still in January of 2014, the CEO of Richards Bay Coal Terminal (RBCT) announced that they were planning a 19 Mt a year capacity expansion, to 110 Mt a year, in response to calls for more capacity allocation to junior miners. The infrastructure requirements of this expansion, which is in the prefeasibility phase, includes the procurement of one additional tippler and one additional ship loader, the extension of the existing stockyard area, the construction of additional conveyors, towers, silos and the reconfiguration of the substation. Also, Richards Bay Coal Terminal (RBCT), the largest terminal in the world, took a decision to stop publishing monthly operational export data detailing shipments of coal in the last quarter of 2014 because it is competitive information according to the Chief Executive of the terminal. The data that RBCT used to regularly publish included the amount of coal it exported each month and the tonnage of stocks it held – information that traders and other market players watched closely.

In February 2014, Australian (ASX)-listed Universal Coal agreed to acquire all the assets and assume certain liabilities on Exxaro's New Clydesdale Colliery (NCC). Universal Coal's CEO asserted that this acquisition marked a major step forward for the company to becoming a midtier coal producer and, expedited the development of the company's second operation. This follows the commissioning of the company's Kangala Mine late towards the end of January, with the first coal being delivered to Eskom in April 2014. NCC includes an extensive resource base, a coal beneficiation facility with a capacity of about two million tons a year and fully equipped with mining machinery and infrastructure. NCC is located adjacent to Universal Coal's Roodekop deposit, over which the DMR granted a mining right in the last quarter of 2013. A water licence for the project was subsequently granted in the fourth quarter of 2014, clearing the way for development for the Roodekop project. Brakfontein currently hosts a Joint Ore Reserves Committee –complaint thermal coal resource of 87.6 Mt, of which 70.5 Mt is estimated to be in the measured category.

Triple-listed Coal of Africa Limited (CoAL) was granted Section 11 approval by the DMR for the disposal of all shares and intercompany loan accounts in NuCoal Mining. The approval was granted effective on January 31 and the sale consideration of R80 million was payed to CoAL. According to the company's CEO, this disposal was another step forward in the company's execution of the five point turnaround strategy which involved the disposal of noncore thermal assets; Woestalleen Colliery, Opgoedenhoop mining right, coal explorer Lemur Resources, the Holfontein project and the Mooiplaats colliery. Subsequently, in March 2015, the DMR also granted Section 11 approval for the disposal of Opgoedenhoop mining right.

It was subsequently announced in September 2014 that the Mooiplaats colliery was sold to privately owned Blackspear Holdings Proprietary for $23.47 million. This colliery, in the Ermelo coalfield, was placed on care and maintenance in October 2013. Blackspear is focussed on operating and developing a portfolio of coal assets in Mpumalanga province. The company owns Puleng operations in Middelburg, the Thutsi coal operations in Ermelo, as well as the Overvaal project in Ermelo.

ASX- and AltX-listed coal miner, Waterberg Coal Company (WCC) completed a feasibility study into the development of an opencast mine to produce 10 Mt of coal per year for Eskom for the next 30 years. The Waterberg Coal Project (WCP) hosts 3.88 billion tons (Bt) of coal, 2.07 Bt of which fell into the measured category. The report found that, terrace mining, which is a total extraction mining method, is necessary to maximise recovery. The method is already used at the adjacent Grootegeluk mine. A conventional coal density separation beneficiation plant will be built capable of handling up to 23.5 Mtpa of ROM coal. The coal will supply Majuba power station. Eskom took a delivery of 200 000 tons of bulk sample product for a burn test, and in August it was reported that the burn was successful thus opening the way for Waterberg coal to be used at the Majuba power station. The WCP will produce about 10 Mtpa of coal when completed. First coal production is expected in 2016, and during construction phase the project will employ 2 000 people and 1 500 thereafter.

Diversified miner, Anglo American's Thermal Coal, announced in April 2014 that it has developed and patented a bioconversion technology that could significantly reduce the cost and improve the rate and quality of opencast mine rehabilitation. The bioconversion technology, which claims to do in six months what nature does in 60 years has been trialled at four Anglo American coal mines and in certain applications, has shown positive results on rehabilitated mining pits and coal discard facilities. Known as Fungcoal, the R17.5 million project harnessed fungi and weathered coal to produce natural fertilizers that are regarded as the building blocks of soil fertility and plant life. The next step in the project is to establish thorough record of land that has been rehabilitated with Fungcoal and gain Fungcoal's use in other applications and over a long time. The developers of this technology indicated that engagement with regulators would take place as the project moved closer to the commercial phase.

White Energy subsidiary River Energy South Africa has signed a deal with Blue Falcon 212 Trading to exclusively build, own and operate a standalone Binderless Coal Briquetting (BCB) plant at the Woestalleen Colliery's hub. River Energy will buy Woestalleen's coal fines in tailing dams and all arising coal fines produced at the three wash plant modules processing run-off-mine coal for the life of the project. The project will comprise a coal fines beneficiation circuit and a 0.25 Mtpa BCB plant.

In July 2014, Resource Generation (ResGen) alerted shareholders that its Boikarabelo Mine in the Waterberg Coalfield would be delayed by between three and six months as engineering firm, Protech Khutele, which was undertaking the earthworks and rail link, as well as the site infrastructure and the roads for the mine, was placed under liquidation. This development will result in the delay of first coal production

from the fourth quarter of 2015 to the second quarter of 2016. Once completed the project will produce up to 20 Mtpa of coal.

In July, government-owned freight and logistics company, Transnet decided to drop its plans to build its own coal terminal because it was able to secure additional export entitlement through Richards Bay Coal Terminal for black-controlled coal exporters from BHP Billiton. Also, Transnet announced an investment of nearly R1 billion to facilitate an increase in coal export volumes from Limpopo's Waterberg to 26 Mt between 2015 and 2019. Transnet indicated that the interim ramp-up phase would move ahead in parallel to a longer-term solution to increase volumes to between 40 Mt and 80 Mt from 2021 onwards. According to Transnet, memorandums of understanding have been signed with a number of coal miners in the Waterberg with commitments totalling 16 Mt, some of which would come on stream by as early as June 2016.
In July, Forbes Coal and Manhattan Corporation (Forbes Coal) took a major step forward in its restructuring and rebranding efforts after the shareholders' approval. The restructuring was aimed at meaningfully reducing the costs and refocussing the company around its existing operating asset base. Forbes Coal was also renamed Buffalo Coal Corporation.

Eskom announced that it will bring in emerging black miners to fulfil its coal supply needs. The state-owned company has already contracted 1.37 Bt of coal it needs over the next 35 years, but another 2.1 Bt remains uncontracted. Eskom has devised the Black Emerging Miner Strategy as a way of working with emerging coal miners while advancing its black-empowerment ownership strategy, which requires its suppliers to be 50 percent plus one share black-owned as directed by the Department of Public Enterprises (DPE).

In his budget speech on the 14th July 2014, the minister of Mineral Resources announced that the department will focus on plans to speed up transformation in South Africa's mining sector and enforce compliance with the Mining Charter. The Mining Charter set a minimum of 26 percent black economic empowerment, and now in its tenth year, the department expected 100 percent compliance by companies. The Minister also asserted that the key requirement of the Mining Charter was for mining companies to improve housing and living conditions of mineworkers, which include the conversion of all hostels into family units. The Minister also announced that there are plans to introduce legislation to formalise the transition of state owned Africa Exploration and Mining Finance Company (AEMFC) into a fully-fledged state-owned mining company (SOMCO). The DMR asserted that it will accelerate the development of the SOMCO in order to supply significant volumes of coal to Eskom. AEMFC has committed to commissioning two coal mines in time to supply Eskom by 2017.

Exxaro Resources, the biggest BEE coal mining company, announced its plans to acquire Total Coal South Africa's coal mining assets. Exxaro Resources entered into a binding sale and purchase agreement with Total Coal South Africa, the majority shareholder in the Dorstfontein and Forzando coal mines, and the country's fifth coal producer. The mines and all the undeveloped coal assets will be bought for $472 million. In this deal, Exxaro Resources plans to acquire 74 percent of the mines, the remaining 26 percent will still be owned by black controlled Mmakau Mining, rendering the mines 100 percent black controlled, should the deal go through. Total Coal also owns 49 percent of currently non-operative Tumelo coal mine, with the remaining shareholding also held by Mmakau. Fifty one percent of the undeveloped Eloff thermal coal resource is also owned by Total Coal South Africa. Total Coal South Africa's mines have a life of mine of more than 20 years and a resource base of 1 498 Mt of coal and 395 Mt of ROM coal resources, all close to Exxaro's existing Witbank operations. Implementation of this deal is subject to consent by the Competition Authority and Mineral Resources Ministry in terms of Section 11 of the Mineral and Petroleum Resources Development Act, No 28 of 2002. The South African Reserve Bank will also have to okay the foreign exchange and then RBCT board will have to approve the changed port allocation.
In another development a junior coal mining company, Kuyasa Mining announced that it will extend its Delmas coal mine by 30 years. This expansion also allows for the rehabilitation of the mine's coal discard disposal facility.

In October 2014, Wescoal Mining acquired the Muhanga Mines (Pty) Ltd's coal processing plant for R42.5 million. The Muhanga processing plant comprises portion 6 of the farm Goedenhoop and also provide Wescoal with a fully-fledged beneficiation asset that is currently operational and has all the necessary regulatory approvals, as well as extensive infrastructure to allow for a multiproduct operation. No other assets or business of Muhanga will be affected by this purchase of the processing plant.

In accordance with the Department of Trade and Industry's (DTI) empowerment legislation which is known as Broad-Based Black Economic Empowerment (BBBEE), Wescoal concluded the first coal supply agreement with power utility Eskom, in terms of which the supply permit is controlled by a black-controlled entity. Wescoal created a special purpose vehicle (SPV) which would own the permit to supply 1.2 Mtpa of coal from Wescoal's Elandspruit coal mine. The SPV was 50.1 percent empowered in accordance with the DTI's BBBEE legislation.

PROJECTS

The Grootegeluk Medupi Expansion Project (GMEP) which was completed in time and on budget started delivering some coal to Medupi in July 2014. The ramp-up to nameplate capacity will continue in line with the revised Eskom Medupi ramp-up plan. The two most important projects, the (GMEP) and New Largo are crucial because they will ensure that the new power stations; Medupi and Kusile, have the required coal supply for the next 30 to 40 years. The New Largo project, owned by Anglo American Inyosi Coal (AAIC) is a 73:27 joint venture between Anglo American and black-owned Inyosi Consortium. In November 2014, AAIC and Eskom signed a memorandum of understanding to conclude the commercial and technical aspects of the project, while engagements on strategic empowerment imperatives are still going on. New Largo will supply Eskom's Kusile power station with thermal coal for about 40 years.

Another big project in Limpopo is the Waterberg Coal Project (WCP). The WCP is owned by the Waterberg Coal Company. The project will produce about 10 Mtpa of coal when completed. First coal is expected in 2016. During construction phase the project will employ 2 000 people and 1 500 thereafter.

Coal of Africa Limited, which idled the Vele mine in 2014 for upgrade, is also on track to restart the mine for commercial production in 2017. Currently, CoAL invested R450 million to modify and expand its Vele colliery beneficiation plant. The modification will allow the company to produce semisoft coking coal, thermal coal and sized coal simultaneously at an expected processing capacity of 2.7 Mtpa of ROM coal. This operation will be opencast for 16 years and underground mining thereafter. CoAL's other project, Makhado thermal and coking coal project, in the Soutpansberg coalfield, has a potential to produce hard coking that will make South Africa a net exporter of coking coal in future and it is regarded as CoAL's anchor project. Once completed the project will produce about 5.5 Mtpa of saleable coal – 2.4 Mtpa of hard coking coal and 3.2 Mtpa of thermal coal. The mine is expected to start producing in 2019.

EMPLOYMENT

The average number of employees in the coal sector decreased by 2.04 percent to 86 242 in 2014 from 88 039 in 2013 (Table 31). This decline could be attributed to the current weak demand and depressed coal prices which forced some producers to idle some of their mines or even dispose of to new owners. In 2014, the coal industry accounted for 17 percent of the country's 495 592 mining workforce, similar to 2013. Male workers accounted for 89.4 percent of total employment in the sector while the balance was female workers.

TABLE 31: EMPLOYMENT IN THE COAL SECTOR, 2004 – 2014

Year	Average number of employees			Earnings - R1 000		
	Total	Males	Females	Total	Males	Females
2005	56 971	54 501	2 470	6 481 823	6 155 962	325 861
2006	57 778	54 933	2 845	7 269 836	6 854 933	414 902
2007	60 439	56 582	3 857	8 692 014	8 107 180	584 834
2008	65 484	60 804	4 680	11 020 687	10 194 389	826 298
2009	70 791	65 227	5 564	12 815 351	11 717 347	1 098 004
2010	74 025	67 348	6 677	14 186 482	12 803 317	1 383 166
2011	78 580	71 545	7 035	16 094 850	14 523 209	1 571 641
2012	78 579	71 542	7 037	16 039 447	14 469 109	1 570 338
2013	88 039	79 270	8 769	18 949 314	16 855 402	2 093 913
2014	86 242	77 109	9 133	20 581 868	18 156 465	2 425 403

Source: DMR, Mineral Economics Directorate

In 2014, earnings in the coal sector grew by 8.62 percent to R20.58 billion from R18.95 billion in 2013. Average per capita earnings was R238 652, representing 10.88 percent increase from 2013's R215 238. Average per capita earnings in the coal industry was 13.6 percent more than the mining industry's average of R206 187 in 2014.

Productivity in the coal industry, in terms production per employee increased by 5.53 percent to 3.08 kt per employee in 2014 from 2.91 kt per employee in 2013.

OUTLOOK

Like 2013, 2014 was a disappointing year for much of the global coal industry. The downward trend in prices that began in mid-2011 continued through to 2014. According to Moody's, aggravating this downward trend were the muted supplier response, slowing demand from China and a weak global economy, and these make any material price recovery unlikely, in 2015 and possibly into the first half of 2016. Weak demand from China, the biggest world coal consumer, will push out the recovery.

According to the president of Coal Association of Canada, about half of the global coal output at current prices, is being produced at a loss. This situation is set to continue until a global rebalance between demand and supply takes place and the global economy rebounds. The current overriding theme in the global industry is to cut costs, or to cut output in order to balance it with the reduced demand and low prices. Already companies have idled non-profitable mines.
The cheapest, most accessible and most reliable source of power is and will remain coal for decades to come. Despite the Group of Seven (G7) industrial powers' pledge to end reliance on fossil fuels by 2100, the World Coal Association (WCA) believes that coal will continue to play a fundamental role in the global economy in the long term. The WCA states that coal plays a critical role in delivering affordable and reliable electricity supply to developing and emerging economies.

Both global and domestic coal-fired energy needs will provide a long future for South Africa's coal industry. Domestic demand is expected to increase in 2015 as Eskom continues to commission other units of Medupi power station. Internationally, India will continue to drive the South Africa's coal export market. Demand from the African countries will also boost the export market as the continent needed a further 7 000 MW of electricity each year to keep up its growth rate. South Africa's coal production is forecast to grow by about one percent in 2015 to 264 Mt. Domestic coal prices are expected to increase to an average of R305 /t in 2015, owing to the stronger demand from the electricity sector. The country's coal exports are expected to be above 76 Mt, driven mainly by India and to some extent Europe. Richards Bay FOB coal prices are forecast to remain subdued in 2015, averaging about $60 /t, due to excess coal in the global market and the persisting weak global economy.

REFERENCES

1. *BP Statistical Review of World Energy, June 2015*
2. *www.globalCoal.com*
3. *South African Coal Report, Issue 2166, 25 February 2014.*
4. *South African Coal Report, Issue 2173, 15 April 2014.*
5. *South African Coal Report, Issue 2175, 29 April 2014.*
6. *Miningmx, Eskom facing test financing junior coal plan, accessed online at http://www.miningmx.com, 23 January 2014*
7. *Leandi Kolver, RBCT planning to expand capacity to 110 Mt/y to accommodate juniors, published 21 January 2014, accessed online at www.miningweekly.com on the 22 January 2014*
8. *Esmarie Swanepoel, Universal commissions Kangala, published 31st January 2014, accessed at www.miningweekly.com, 04 February 2014*
9. *Esmarie Swanepoel, Uniuversal Coal buy's Exxaro's New Clydesdale mine, published 4th February 2014, accessed at www.miningweekly.com, 05 February 2014*
10. *Natalie Greve, CoAL gets DMR nod for NuCoal disposal, published 5th February 2014, accessed at www.miningweekly.com, 06 February 2014*
11. *Natasha Odendaal, Waterberg Coal feasibility concluded, , published 6th February 2014, accessed at www.miningweekly.com, 07 February 2014*
12. *Chantelle Kotze, R17.5m Anglo project to improve, accelerate mine rehabilitation, , published 23rd April 2014, accessed at www.miningweekly.com, 29 April 2014*
13. *Natalie Greve, DMR approves disposal of CoAL mining right, published 27th March 2014, accessed at www.miningweekly.com, 31 March 2014*
14. *Esmarie Swanepoel, Protech Khuthele liquidation delays ResGen coal project, published 2nd July 2014, accessed at www.miningweekly.com, 07 July 2014*
15. *South African Coal Report, Issue 2184, 1 July 2014.*
16. *Chantelle Kotze, Eskom to include emerging black coal miners in supply base, published 11th July 2014, accessed at www.miningweekly.com, 15 July 2014*
17. *South African Coal Report, Issue 2187, 22 July 2014.*
18. *South African Coal Report, Issue 2192, 26 August 2014.*

19. *South African Coal Report, Issue 2193, 2 September 2014.*
20. *Esmarie Swanepoel, Coal of Africa sells idled Mooiplaats for $23.5m, published 22nd September 2014, accessed at www.miningweekly.com, 09 September 2014*
21. *South African Coal Report, Issue 2196, 07 October 2014.*
22. *South African Coal Report, Issue 2197, 14 October 2014.*
23. *Reuters, South Africa's main coal terminal stops releasing export data, published 23rd October 2014, accessed at wwww.miningweekly.com, 24th October 2014*
24. *A review of South Africa's coal sector, published by Creamer's Media Research Channel Africa, August 2015*
25. *Coal of Africa Limited, Makhado Fact Sheet, July 2015*

HYDROCARBON FUELS

KL Revombo

SUPPLY AND DEMAND

World total proven oil reserves amounted to 1 700 billion barrels (bbl) at the end of 2014 (Table 32). This is a 0.1 percent decline from 1 701 bbl at the end of 2013. Saudi Arabia hosted the largest reserves, accounting for 15.7 percent of total global oil reserves, followed by Canada's 10.2 percent and Iran's 9.3 percent.

TABLE 32: WORLD RESERVES AND PRODUCTION OF OIL AND NATURAL GAS, 2014

	PROVED RESERVES				PRODUCTION			
	OIL		GAS		OIL		GAS	
	(bbl x10^9)	%	(m^3 x 10^{12})	%	(1000 bbl/d)	%	(m^3 x 10^9)	%
OPEC COUNTRIES								
Algeria	12,2	0,7	4,5	2,4	1 525,4	1,7	83,3	2,4
Indonesia	3,7	0,2	2,9	1,5	852,3	1,0	73,4	2,1
Iran	157,8	9,3	34,0	18,2	3 614,3	4,1	172,6	5,0
Iraq	150,0	8,8	3,6	1,9	3 285,3	3,7	1,3	0,0
Kuwait	101,5	6,0	1,8	1,0	3 122,9	3,5	16,4	0,5
Libya	48,4	2,8	1,5	0,8	498,3	0,6	12,2	0,4
Nigeria	37,1	2,2	5,1	2,7	2 360,6	2,7	38,6	1,1
Angola	12,7	0,7	-	-	-	-	-	-
Qatar	25,7	1,5	24,5	13,1	1 981,9	2,2	177,2	5,1
Saudi Arabia	267,0	15,7	8,2	4,4	11 504,7	13,0	108,2	3,1
United Arab Emirates (UAE)	97,8	5,8	6,1	3,3	3 711,6	4,2	57,8	1,7
Venezuela	298,3	17,5	5,6	3,0	2 719,5	3,1	28,6	0,8
Subtotal	**1 216,5**	**71,3**	**97,8**	**52,3**	**35 176,7**	**39,7**	**769,6**	**22,2**
OTHER SELECTED COUNTRIES								
Argentina	2,3	0,1	0,3	0,2	629,1	0,7	35,4	1,0
Australia	4,0	0,2	3,7	2,0	448,1	0,5	55,3	1,6
Brazil	16,2	1,0	0,5	0,3	2 346,3	2,6	20,0	0,6
Brunei	1,1	0,1	0,3	0,2	126,4	0,1	11,9	0,3
Canada	172,9	10,2	2,0	1,1	4 292,3	4,8	162,0	4,7
China	18,5	1,1	3,5	1,9	4 246,0	4,8	134,5	3,9
Ecuador	8,0	0,5	0,0	0,0	556,4	0,6	0,0	0,0
Europe and Eurosia (EE)	2,0	0,1	0,2	0,1	17 197,8	19,4	1002,4	29,0
India	5,7	0,3	1,4	0,7	894,8	1,0	31,7	0,9
Malaysia	3,8	0,2	1,1	0,6	666,0	0,8	66,4	1,9
Mexico	11,1	0,7	0,3	0,2	2 784,2	3,1	58,1	1,7
Oman	5,2	0,3	0,7	0,4	943,5	1,1	29,0	0,8
United States of America (USA)	48,5	2,9	9,8	5,2	11 644,1	13,1	728,3	21,0
Other	184,3	10,8	65,5	35,0	6721,0	7,6	356,0	10,3
Subtotal	**483,6**	**28,4**	**89,3**	**47,7**	**53 496,0**	**60,3**	**2 691,0**	**77,8**
TOTAL	**1700,1**	**99,75**	**187,1**	**100**	**88 672,6**	**100**	**3 460,6**	**100**

Source: BP Statistical Review of World Energy, June 2015

Notes: [+] Includes crude oil, shale oil, oil sands and natural gas liquids and excludes liquid fuels derived from other sources such as coal

* Excludes gas flared or recycled

Organization of the Petroleum Exporting Countries (OPEC) accounted for 71.6 percent of the world's oil reserves while non-Opec countries accounted for the remainder.

At present South Africa does not have significant proven oil reserves. According to the South African Oil and Gas Alliance, at the end of 2014, the country had proven crude oil reserves of 15 million barrels, located offshore in southern South Africa in the Bredasdorp Basin and off the west coast of the country near the border with Namibia.

The world's proven gas reserves increased by 0.31 percent to 187.1 trillion cubic metres (tcm) in 2014 from 186.5 tcm in 2013. The Middle East accounted for 42.7 percent of the reserves, followed by Europe and Eurasia's 31 percent and Asia's 8.2 percent. The top three countries with the highest gas reserves were Iran, Russia and Qatar, accounting for 18.2 percent, 17.4 percent and 13.1 percent of the global reserves, respectively.

South Africa has significant potential for unconventional gas in the form of Coal Bed Methane (CBM) and shale gas, for which it is ranked 8th and 12th respectively, in the world. The country hosts 20 to 30 trillion cubic feet (tcf) of CBM resources and about 390 tcf of shale gas technically recoverable resources. The Petroleum Agency of South Africa (PASA) estimates the country's shale gas potential reserves to be 30 tcf. The conventional gas reserves are estimated at 27.2 million cubic metres (mcm).

Global oil production increased by 2.3 percent to 88.7 million barrels per day (mbbl/d) in 2014, owing mainly to the 5.7 percent increase from non-OPEC countries. The Middle East at 31.7 percent was the world's largest producer, followed by North America's 20.5 percent and Europe and Eurasia's 19.8 percent. Africa recorded the largest drop in oil production due to the political unrest in Libya which decreased its output by 49.8 percent. Following Libya with substantial oil production decreases were Syria's 44.4 percent and Tunisia's 13.3 percent. The world's largest oil production increase by country was recorded by South Sudan where output increased by 60.6 percent, followed by the United States (US) at 15.9 percent and Brazil at 11.2 percent. South Africa did not produce crude oil 2014. The country imported most of its crude oil demand and the balance was produced from the coal-to-liquid and gas-to-liquid technologies from coal and natural gas respectively.

Global gas production increased by 1.6 percent to 3 460.6 billion cubic metres (bcm) in 2014 from 3 408.8 bcm in 2013. Despite a drop of 3.1 percent, Europe and Eurasia was the largest producer accounting for 28.8 percent of global total, followed by North America's 27.7 percent and the Middle East's 17.3 percent. Countries that recorded the largest increases were Myanmar, Turkmenistan and Libya, with growths of 28.6 percent, 11.1 percent and 10.9 percent respectively. The world's largest volumetric increase was the US's 6.1 percent whereas the largest volumetric declines were Russia's 4.3 percent and the Netherlands' 18.7 percent.

In 2014, South Africa recorded low gas production. The country's natural gas production grew by 28.7 percent to 849.2 kt from 659.6 kt in 2013 whereas natural gas condensate increased by 45.1 percent to 88.8 kt.
Global primary energy consumption increased by 0.9 percent in 2014 as growth for all energy carriers slowed except nuclear fuel. Consumption increased in all regions except Europe and Eurasia where it declined by 2.8 percent. China's growth in consumption slowed to its lowest level since 1998, as its economy rebalanced away from energy intensive sectors. However, China, at 23 percent, remained the largest consumer of primary energy followed by the US at 17.8 percent and Russia at 5.3 percent. Oil remained the world's leading energy source, with 32.6 percent of global energy consumption, while natural gas accounted for 23.7 percent.

Following the primary energy consumption trend, world oil consumption grew by 0.8 percent to 92 mbbl/d in 2014 compared with 91.2 mbbl/d in 2013. Organization for Economic Cooperation and Development's (OECD) oil consumption declined by 1.2 percent and non-OECD countries accounted for net growth in global consumption. China's 390 thousand barrels per day (tbbl/d) was the largest increment to global oil consumption by country. Continentally, Africa recorded the highest growth of 4.2 percent, followed by the Middle East's at 2.8 percent and South and Central America's 2.7 percent. The US was the largest oil consumer in 2014 at 19.9 percent of the global oil consumption, followed by China's 12.4 percent and Japan's 4.7 percent.

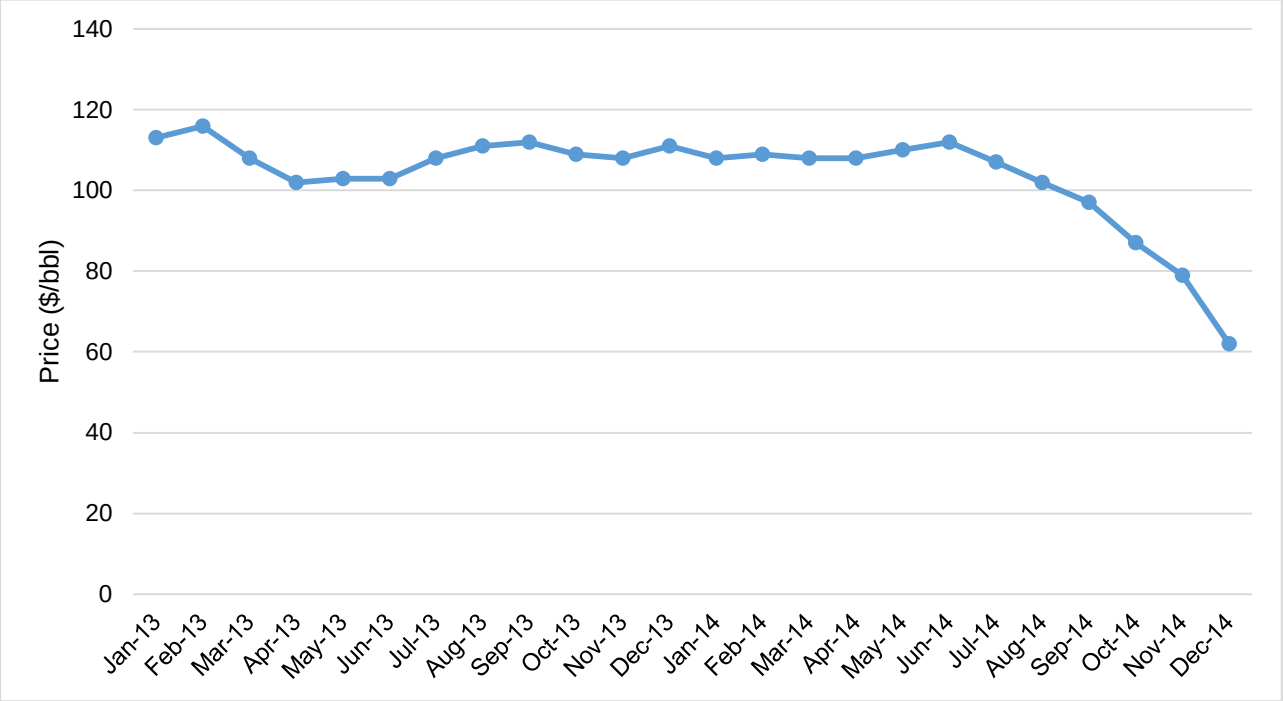
World natural gas consumption grew by 0.4 percent to 3 393 billion m^3 in 2014. Europe and Eurasia recorded the largest volumetric decline of 4.8 percent in gas consumption, while the US, China and Iran reported the largest volumetric increments of 2.9 percent, 8.6 percent and 6.8 percent respectively.

According to the figures from the South African Revenue Service, quoted by the US Energy Information Administration, in 2014, South Africa imported 425 000 bbl/d of crude oil and about 77 percent of its natural gas requirements through a pipeline from Mozambique. The crude oil imports were mostly sourced from the OECD. Locally, using coal and gas as feedstock, South Africa has a capacity to produce 195 000 bbl/d of liquid fuel products. Petrochemicals company Sasol has a capacity to produce 150 000 bbl/d from the coal-to-liquid process while PetroSA can produce 45 000 bbl/d from the gas-to-liquid process. However, in 2014 PetroSA reported that it produced 14 percent less than its capacity due to severe feedstock constraints.

PRICES

In 2014, the annual average Brent crude oil price dropped by 9.17 percent to $99 /bbl compared with $109 /bbl in 2013. Prices started the year at $108 /bbl, peaked at $112 /bbl in June, and thereafter fell sharply to reach $62 /bbl in December 2014 (Figure 28), owing mainly to a combination of slowing demand and the global oversupply of crude oil. Demand seemed to have been hammered by China's slowing economy as well as the stagflation in Europe.

FIGURE 28 MONTHLY AVERAGE BRENT CRUDE PRICES, JANUARY 2014 – JUNE 2015



Source: Sapia, 2014 Annual Report

The average Henry Hub Natural gas prices increased by 17.79 percent to $4.39/Btu in 2014 from $3.73/Btu in 2013 boosted mainly by the marginally increased global demand for natural gas.

KEY DEVELOPMENTS

In January 2014, Southern African gas explorer and developer, Sunbird Energy revealed that it will fast-track the commercial development of the Ibhubesi Gas Project, offshore of South Africa. This project is a joint venture (JV) between Sunbird Energy (76 percent) and PetroSA (24 percent). In another development, in June 2014, Sunbird Energy received final approvals for the acquisition of the Ibhubesi gas project from Forest Oil Corporation. Project Ibhubesi recorded a maiden reserve of 540 billion cubic feet (bcf). In another major development in September 2014, Sunbird Energy reported that Pan-African investment company Vandasia Investments acquired 43.9 percent interest in Sunbird for about A$25 million.

Sunbird Energy and its partner PetroSA entered into an agreement with Eskom to sell gas from Ibhubesi field to the Ankerlig power plant. The 1 388 MW Ankerlig facility near Saldanha in the Western Cape is the biggest of Eskom's four gas turbines that are currently powered by diesel, which can be converted to run on natural gas. The company is expected to deliver its first gas in 2018. According to Sunbird this agreement will encourage further development of the gas project and boost exploration in the Orange Basin.

Government indicated, in August 2014, that it is ready to regulate and monitor companies that have expressed interest in exploring shale gas in the country. This announcement came amid oil and gas exploration and development companies threatening to halt explorations in the country citing legislative uncertainties.

In September 2014, Petroleum Agency South Africa (PASA) reported that interest in oil and gas exploration off South Africa's coast has increased to such an extent that all the country's offshore exploration blocks are under licence or under application for exploration. PASA also confirmed in October 2014 that it would proceed with the processing of pending shale-gas exploration applications received prior to 01 February 2011. According to the South African Oil and Gas Alliance, coalbed methane exploration interest in South Africa continues to grow with 25 exploration rights awarded, while some companies are applying for production rights.

The South African government is also busy with Operation Phakisa, which is an initiative designed to fast track the implementation of solutions on critical development issues. Under mining, Operation Phakisa aims to stimulate the development of 30 offshore exploration wells in ten years, creating up to 130 000 jobs with a yearly contribution to gross domestic product of $2.2 billion, while reducing South Africa's dependence on oil and gas imports during the production phase.

South Africa's Department of Energy is developing the 20 year liquid fuels infrastructure roadmap to ensure continued security of supply of liquid fuels to enable the country's Africa's growth and development. The roadmap will also assist in determining the capabilities and capacity for local refining, storage, handling and logistics. This will also give confidence to the companies that are exploring and developing oil and gas operations in the country.

OUTLOOK

According to Sasol's CEO, David Constable, oil prices are expected to remain low until the end of 2017, with average Brent crude oil prices expected to remain between $50 /bbl and $60 /bbl in 2016, amid the current unfavourable economic climate. This might look good for South Africa as a net importer of crude oil, but the weaker rand may reduce the benefits. Considering the current demand and supply situation, OPEC countries did not respond to the increasing supply as it did previously in situations of low demand and lower prices. Sapia suggests that this action by OPEC is to support its market share rather than to reduce supply, rebalance the oil market and subsequently ensure a higher market price.

South Africa's natural gas production is forecast to remain at current levels in 2015 as PetroSA is still busy with the drilling project in the F-O field, also known as Project Ikhwezi. So far, project Ikhwezi has been unsuccessful in finding the amount of gas reserves PetroSA has been targeting, with the drilling yielding only 10 percent of the gas anticipated. PetroSA, in a JV with Sunbird Energy, is also developing the Ibhubesi gas field and expects first production in 2016. The country's gas industry future may be boosted by shale gas in future as recent improvements in exploration technologies, coupled with the need for South Africa to diversify its energy mix has seen increased interest in exploration activity off South Africa's coast, with 20 exploration licences issued.

South Africa's crude oil production continued to decline as oil fields mature and as commercially viable discoveries were not yet made. It is not clear as to when PetroSA will restart crude oil production. The country's oil industry can be revived by the offshore Orange Basin near Namibia which is believed to hold substantial oil and gas resources.

REFERENCES

.

1. BP Statistical Review of World Energy, June 2015
2. Eurasia Review, news and analysis, accessed at http://www.eurasiareview.com on 2015/06/24
3. http://www.investing.com/commodities/brent-oil-historical-data
4. Creamer Media's Research Channel Africa, Liquid Fuels, A review of South Africa's liquid fuels industry December 2014
5. Creamer Media's Research Channel Africa, Liquid Fuels September 2015
6. Mineral Economics Directorate, DMR
7. Sapia, 2014 Annual Report
8. http://www.eia.gov/dnav/ng/hist/rngwhhdm.htm
9. Zandile Mavuso, Gas-based industrialization vision hinges on sound policy, gas to power roll-out, published on 21st August 2015, accessed online at www.engineeringnews.co.za, 24 August 2015

URANIUM

KL Revombo

SUPPLY AND DEMAND

World uranium resources recoverable at $130/kg, were estimated at 5 902 ktU in 2014. Australia, accounting for 28.9 percent of the world's largest known recoverable uranium resources, was leading, followed by Kazakhstan's 11.5 percent and Russia's 8.6 (Table 33). South Africa, at 5.7 percent, is ranked 7th in the world and hosts Africa's third largest resources after Niger (6.86 percent) and Namibia (6.48 percent) respectively.

TABLE 33: WORLD URANIUM RESOURCES AND PRODUCTION, 2014

COUNTRY	URANIUM RESOURCES* RAR#			PRODUCTION+ 2013	2014		
	(ktU)	%	Rank		(kt U)	%	Rank
Australia	1 706	28.90	1	6.35	5.00	8.89	3
Canada	494	8.37	4	9.33	9.13	16.24	2
China[e]	199	3.37	9	1.45	1.50	2.67	9
Namibia	383	6.48	6	4.32	3.26	5.79	5
Niger	405	6.86	5	4.53	4.06	7.21	4
Kazakhstan	679	11.51	2	22.57	23.13	41.11	1
Russia	506	8.57	3	3.14	2.99	5.32	6
South Africa	338	5.73	7	0.63	0.67	1.19	11
Ukraine[e]	118	1.99	10	1.08	0.96	1.71	10
USA	207	3.51	8	1.84	1.92	3.41	8
Uzbekistan	91	1.55	11	2.40	2.40	4.27	7
SUBTOTAL	5 127	-	-	57.61	55.01	0	-
Others	776	13.15		2.06	1.24	2.20	
World Total	**5 903**	**100**		**59.67**	**56.25**	**100**	

Sources: **OECD's NEA & IAEA, Uranium 2014: Resources, Production and Demand*
+ World Nuclear Association, Market Report data, 2014
Notes: #Reasonably Assured Resources (RAR) plus Inferred Resources, to $130/kg U
e: Estimate

World uranium mine production declined by 6 percent from 59.7 ktU in 2013 to 56.3 ktU in 2014 (Table 33). The largest decline at 24.6 percent was from Namibia, followed by Australia's 21.2 percent and Ukraine's 10.5 percent. At 41.1 percent; Kazakhstan dominated word output, followed by Canada's 16.2 percent and Australia's 8.89 percent. Together, these three countries accounted for 66.2 percent of the global uranium output. In 2014, Africa's contribution to Uranium mining was from Namibia, Niger, South Africa and Malawi. Africa accounted for 14.8 percent of global output. At present, about 42 percent of uranium comes from conventional mines, about 51 percent from in situ leach, and seven percent is recovered as a by-product from other mineral extraction.

In South Africa uranium is produced mainly as a by-product from the treatment gold-bearing ores, and this is exported by Anglo-American's Nuclear Fuel Corporation (Nufcor) as uranium oxide (U_3O_8). The country's uranium output increased by 6.7 percent in 2014.
Global uranium demand is mainly driven by nuclear power generation with a small amount also being used for medical and research purposes, and some for naval propulsion. According to the World Nuclear Organisation, the current global demand for uranium is about 67 000 tU per annum. In 2014, 56.24 kt were produced and the remainder sourced from secondary sources of uranium like civil stockpiles and recycled uranium. Global nuclear electricity generation increased by 2.2 percent from 2 359 KWh in 2013 to 2 411 KWh in 2014 (Table 34). This demand for nuclear power is expected to grow as the number of nuclear reactors increased from 434 to 438 reactors. The USA dominates the nuclear energy industry as it operates 99 nuclear reactors, followed by France's 58 and Japan's 43. The USA derived 19.5 percent of its electricity from nuclear energy, while France and South Korea drew 76.9 percent and 30.4 percent respectively. South Africa generates 5.7 percent of its

electricity from two nuclear reactors. Globally, about 65.9 kt of uranium was consumed in nuclear energy reactors in 2014. There are 65 nuclear reactors under construction globally.

TABLE 34: WORLD NUCLEAR POWER REACTORS AND URANIUM REQUIREMENTS, 2013-2015

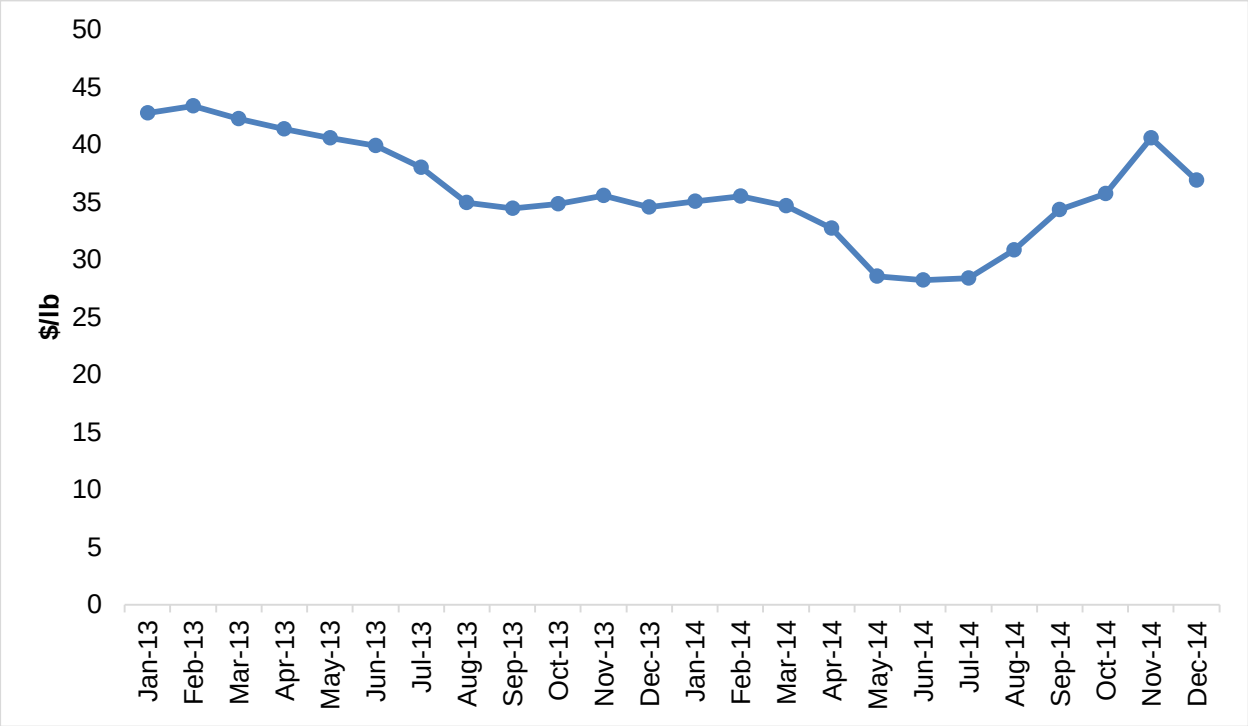
COUNTRY	NUCLEAR ELECTRICITY GENERATION 2014		REACTORS OPERABLE 2015		URANIUM REQUIRED 2015	REACTORS OPERABLE 2014		URANIUM REQUIRED 2014
	billion kWh	% of elec	No	MWe	(t U)	No	MWe	(t U)
USA	798.6	19.5	99	98 915	18 692	100	99361	18 816
France	418	76.9	58	63 130	9 230	58	63130	9 927
Japan	-	-	43	40 480	2 549	48	42569	2 119
Germany	91.8	15.8	8	10 728	1 889	9	12003	1 889
Korea (South)	149.2	30.4	24	21 677	5 022	23	20656	5 002
Russia	169.1	18.6	34	25 264	4 206	33	24253	5 456
UK	57.9	17.2	16	9 373	1 738	16	10038	1 738
China	123.8	2.4	29	26 239	8 161	20	17055	6 296
Spain	54.9	20.4	7	7 002	1 274	7	7 002	1 274
Canada*	98.6	16.8	19	13 553	1 784	19	13553	1 784
Sweden	62.3	41.5	9	8 849	1 516	10	9508	1 516
Ukraine	83.1	49.4	15	13 107	2 366	15	13168	2 359
Belgium	32.1	47.5	7	5 943	1 017	7	5 943	1 017
South Africa	14.8	5.7	2	1 830	305	2	1 830	305
SUBTOTAL	2 154.2		370	346 090	59 749	367	325 294	57 139
Others	256.8		68	35 473	7 134	67	49 319	8 769
World	**2 411**	**11.5**	**438**	**381 563**	**66 883**	**434**	**374 611**	**65 908**

Notes:
% of elec: *percent contribution to national electricity production*
MWe: *Megawatt net (electrical as distinct from thermal)*
kWh: *kilowatt-hour*
*** *estimate*
Sources: *World Nuclear Association, 2015*

PRICES

The downward trajectory of Uranium prices continued in 2014. The average uranium price decreased by 13.21 percent from $38.58 /lb in 2013 to $33.48 /lb in 2014. The prices started the year at $35.1 /lb and marginally increased to $35.5 /lb before falling to reach $28.54 /lb in May 2014 (Figure 29). Thereafter, the uranium prices steadily increased to reach $40.6 /lb by November 2014 before closing the year at $36.95 /lb.

FIGURE 29: AVERAGE MONTHLY SPOT URANIUM PRICES, 2013-2014



Source: Indexmundi.com

According to Uranium-wise, this uranium price remained below the lower bound of approximately $60 - $70 per lb U_3O_8 required for the profitability of many of the mine projects currently under consideration or under development, sending the already battered uranium industry into some sort of hibernation mode.

KEY DEVELOPMENTS

In Canada:

- In January, the French antinuclear network 'Sortir du nucléaire' handed out to French Ministers a petition with 30,000-signatures against Areva's Kiggavik uranium mining project near Baker Lake, Nunavut. In October, Areva submitted its Final Environmental Impact Statement on the project.
- After years of delays, ore production finally began at Cameco's Cigar Lake high-grade mine in Saskatchewan in March, but had to be suspended again in July due to a freezing problem; ore production resumed in September.

In the USA:

- In July, the Navajo Nation Council reversed a standing committee resolution that allowed Uranium Resources Inc. access to its Church Rock / Crownpoint uranium in situ leach mine site in New Mexico. In November, the Nuclear Regulatory Commission (NRC) put the license renewal for the project on hold to give the company time to complete its discussions with the Navajo Nation Council.
- In February, the Bureau of Land Management (BLM) approved Cameco's Gas Hills uranium in situ leach project in Wyoming.
- In March, Energy Fuels Inc. announced plans for an open pit mine with heap leaching at Juniper Ridge in Wyoming.
- In April, the NRC issued an operating licence for the Ross uranium in situ leach project in Wyoming; in July, a NRC Board announced to grant intervenors a hearing.
- Also in April, the Nichols Ranch uranium in situ leach mine in Wyoming started operation; the uranium-loaded resin is sent to Cameco's Smith Ranch plant for further processing.
- In April, the NRC issued a license for Powertech Uranium Corp.'s Dewey-Burdock uranium in situ leach mine project in South Dakota. The Oglala Sioux Tribe then invoked federal treaties and international agreements against the mine, and an NRC Board issued a temporary stay against the operating license. In August, an NRC Board ruled that Powertech must release geological survey

data for the mine. In October, an Environmental Protection Agency (EPA) assessment found radioactive contamination at abandoned uranium mines in the project area of the proposed Dewey-Burdock uranium mine (see below).
- The Forest Service issued a favourable draft decision for the La Sal mine in Utah.
- In July, Energy Fuels Inc. announced the sale of its Piñon Ridge uranium mill license and several mining assets in Colorado. In September, a Denver district judge suspended the license to build the Piñon Ridge uranium mill, again, as the state's hearing process did not comply with the requirements.
- The EPA partly withdrew the aquifer exemption for the Goliad in situ leach uranium mine project in Texas.

In Central/South America:

- In April, public comment was invited on the Environmental Impact Assessment (EIA) for the Itataia uranium/phosphate mine project in Santa Quitéria, Ceará, Brazil. In July, the hearings on the project were postponed.
- In March, protestors against a uranium mining project in Quebrada de Alipán blocked a highway in La Rioja, Argentina; they blamed the project for a water shortage experienced in the area.
- An Environmental Impact Study was presented for the Sierra Pintada uranium mine in Mendoza, Argentina.
- Residents filed an appeal to the Supreme Court to prevent mining in the UNESCO World Heritage area of Quebrada de Humahuaca in Jujuy, Argentina.

In Africa:

- The National Environmental Management Council (NEMC) of Tanzania has decided that the Madaba project which is located in the World Heritage Selous Game Reserve does not require a full Environmental Impact Assessment.
- Denison Mines further wrote down the value of its Mutanga uranium mine project in Zambia.
- The Letlhakane uranium mine in Botswana will be opened in 2016, according to the Botswana Chamber of Mines.
- In January, public comment was invited on the Environmental Impact Assessment (EIA) for the heap leach pilot plant at Bannerman Resources' Etango uranium mine project in Namibia. In September, contracts were awarded for the heap leach pilot plant.
- Areva announced that it has no plans to restart its mothballed Trekkopje uranium mine project in Namibia.
- In May, the Chinese-owned Husab uranium mine (formerly Rössing South) in Namibia was commissioned. Cameco Corp. has shown interest in buying offtake output from the mine. In August, construction of a sulfuric-acid plant was to start at the mine.
- Deep Yellow Ltd plans to develop the Tubas Sand uranium mine in Namibia as an interim standalone project, until its Omahola project would come on stream. For the latter, heap leaching is being eyed now as the preferred development strategy.
- Construction of Forsys Metals Corp's Valencia uranium mine in Namibia is to start in early 2015.
- In May, the first consignment of uranium was shipped from Sibanye Gold Ltd's Ezulwini plant in South Africa.

In Europe:

- In Greenland, the plan for an overseas refinery for the rare earth - uranium concentrates to be produced at the proposed Kvanefjeld mine was abandoned. Greenland Minerals and Energy Ltd now considers that the most suitable location for the hydrometallurgical refinery is in Greenland, adjacent to the mine and concentrator.
- The Czech government announced in March to consider the re-opening of the Brzkov uranium mine in the Vysočina region. In September, a demonstration was held against the re-opening of the mine. A petition against the mine project was supported by over 1,500 people. In December, the Czech Cabinet approved the preparation of a study on possible uranium mining in Brzkov.
- In Spain, a mining licence was granted in April for Berkeley Resources' Retortillo uranium deposit in Salamanca. In December, 115,000 signatures against the uranium mine project were handed over to the Ministry of Industry, and a protest march was held in Retortillo.

In Asia:

- Jordan plans to develop its first uranium deposit in 2015, uranium exports are expected by 2020.
- In India's north-eastern state of Meghalaya, neighbouring villages urge the start of uranium mining in Kylleng-Pyndeng-Sohiong, while regional parties and the District Council oppose the uranium mine project.
- In Andhra Pradesh, groundwater contamination is expected to increase beyond standards once uranium mining commences at the Lambapur-Peddagattu project, researchers say.

In Australia:

- Areva is suing the Australian government over the inclusion of the Koongarra uranium deposit in Kakadu National Park (Northern Territory).
- The Queensland Government invited tender for reopening the abandoned Mary Kathleen uranium mine.
- Cameco submitted a new referral with a doubled production rate for its Yeelirrie uranium mine project (Western Australia).
- Comments were invited on the Environmental Scoping Document for Energy and Minerals Australia Ltd's Mulga Rock uranium mine project (Western Australia).
- The licensing process was initiated for the Millipede and Lake Maitland extensions of Toro Energy Ltd's Wiluna uranium mine project in Western Australia. Wiluna Martu Elders have condemned the move to expand the yet unrealised Wiluna mine plan into a much larger uranium precinct spanning 100 km and which will destroy ecologically sensitive lake systems.
- Cameco's Kintyre uranium mine project in Western Australia obtained state environmental approval; environmental groups filed an appeal.
- The Beverley Four Mile uranium in situ leach mine in South Australia, majority-owned by General Atomics' subsidiary Quasar Resources, started operation.

OUTLOOK

According to the OECD, Uranium 2014 Resources, Production and Demand, global uranium demand is projected to increase in the long term. For short term however, rising mining and development costs and the long pause in nuclear development following the Fukushima Daiichi accident, delays in some of the higher cost planned mine developments have been announced and more could follow should prices decline further. With 62 reactors under construction globally, a return to more favourable market conditions should see at least some of these delayed projects reactivated in order to ensure supply to a growing global nuclear fleet.

The demand for uranium fuel is much more predictable than with probably any other mineral commodity, because despite the high capital costs, once reactors are built it is very cost-effective to keep them running at high capacity and for utilities to make any adjustments to load trends by cutting back on fossil fuel use. Uranium demand is expected to increase globally as the new build reactors get commissioned.

According to the Uranium Participation Corporation, future uranium prices will be influenced by increased demand from new reactors being constructed, as well as the amount of incremental supply made available to the market from the remaining excess utility inventories, government inventories and other sources of secondary supply, and the availability of increased or new production from other uranium producers. Uranium demand and supply will also be influenced by factors such as public acceptance of nuclear power, electricity demand, other methods of electricity generation, such as natural gas, the availability of financing for the construction of reactors, and the exploration and development of new production sources, to name a few.

In South Africa, the Integrated Resource Plan 2010 (IRP 2010) has committed a nuclear fleet of 9 600 MW by 2030. This is going to increase nuclear’s contribution from 5 to 20 percent towards the country’s energy mix.

REFERENCES

1. *Creamer Media, www.miningweekly.com*
2. *Mycle Schneider, Antony Froggatt et al, World Nuclear Industry Status Report 2015*
3. *World Nuclear Association, World Nuclear Power Reactors & Uranium Requirements, 2 November 2015*
4. *http://www.wise-uranium.org/uissr14.html*
5. *Uranium 2014, Resources, Production and Demand, NEA No. 7209, OECD 2014*
6. *http://www.uraniumparticipation.com/s/Uranium_Market.asp*

NON-FERROUS METALS AND MINERALS OVERVIEW

L Ramane

INTRODUCTION

South Africa is well endowed with nonferrous minerals, particularly titanium and zirconium resources, which are found in heavy mineral sands along the coastal provinces of this country including Kwa-Zulu Natal, Eastern Cape and Western Cape. Cobalt, copper and nickel are produced as by-products of platinum mining in the Bushveld Complex. Copper is mainly found in the Palabora Complex in the Limpopo Province, with zirconium and nickel being produced as by-product. Lead and zinc deposits associated with copper are mined near Aggeneys, Northern Cape. Nickel deposits are mined in the Uitkomst Complex near Badplaas in the Mpumalanga Province. Antimony deposits are located in the Limpopo Province.

PRODUCTION AND SALES

In 2014, South Africa's production of primary non-ferrous metals and minerals, excluding titanium and zircon, plummeted by 7.9 percent to 191.3 kt compared with 207.7 kt the previous year, this was due to a major drop in the production of some metals particularly antimony, which fell by about 66 percent., owing to financial and technical constraints at Consolidated Murchison Mine (Table 35). Local sales volume and revenue dropped by 18.2 and 6.7 percent to 53.2 kt and R4.9 billion, respectively. While export sales volume and revenue rose by 8.9 and 30.7 percent to 146.6 kt and R11.6 billion, as a result of increased nickel export sales.

South Africa's total production of non-ferrous metals and minerals (primary and processed), excluding titanium and zircon minerals increased by 21.6 percent to 960.6 kt in 2014 compared with 2013. Total sales volumes amounted to 1.9 Mt excluding titanium and zircon minerals as well aluminium and zinc metals, and total sales revenue was R33.3 billion.

TABLE 35: SOUTH AFRICAN PRODUCTION AND SALES OF NON-FERROUS METALS AND MINERALS, 2013 AND 2014

	PRODUCTION		LOCAL SALES (FOR)		EXPORT SALES (FOB)		TOTAL SALES	
COMMODITY	**Year**	**(t)**	**(t)**	**R'000**	**(t)**	**R'000**	**(t)**	**R'000**
Antimony (mic)	2014	815	22	1 633	758	52 020	780	53 653
	2013	2 405	9	777	2 267	149 553	2 276	150 330
Cobalt	2014	1 332	50	16 754	753	243 954	803	260 709
	2013	1 294	51	11 868	740	193 226	791	205 093
Copper	2014	78 697	45 004	3 483 784	36 685	2 466 769	81 689	5 950 553
	2013	80 821	56 039	4 056 792	26 239	1 76 667	82 278	5 817 459
Lead	2014	29 348	0	0	33 381	659 777	33 381	659 777
	2013	41 848	0	0	37 816	683 219	37 816	683 219
Nickel	2014	54 956	8 102	1 429 476	48 120	7 705 911	56 222	9 135 386
	2013	51 208	8 924	1 216 372	40 646	5 741 253	49 570	6 957 625
Titanium minerals	2014	2 511 228	2 757 010	2 934 342	123 098	1 025 241	2 880 108	3 959 583
	2013	2 604 157	2 681 810	2 712 307	100 269	1 028 312	2 782 079	3 740 619
Zinc (mic)	2014	26 141	0	0	26 881	455 631	27 554	455 631
	2013	30 145	0	0	26 881	335 687	26 881	335 678
Zirconium minerals	2014	398 101	11 798	138 836	430 865	4 601 410	442 663	4 740 246
	2013	224 446	11 277	125 326	437 642	4 819 625	448 919	4 944 952
Primary subtotals	**2014**	**3 103 023**	**2 821 995**	**8 004 827**	**703 481**	**17 210 863**	**3 525 476**	**25 215 689**
	2013	**3 036 324**	**2 758 110**	**8 123 442**	**672 500**	**12 952 636**	**3 430 610**	**17 023 333**
Aluminium metal	2014	769 314	207 392	4 660 389	548 071	12 151 931	755 463	16 812 321
	2013	823 783	***	***	***	***	***	***
Titanium slag	2014	1 025 572	23 660	135 200	962 869	6 339 610	986 529	6 474 810
	2013	***	***	***	***	***	***	***
Zinc metal	2014	0	0	0	0	0	0	0
	2013	0	0	0	0	0	0	0
Processed subtotals	2014	1 794 886	231 052	4 795 589	1 510 940	18 491 542	1 741 992	23 287 131
	2013	823 783	***	***	***	***	***	***
Non-Ferrous Totals	**2014**	**4 897 909**	**3 053 047**	**12 800 415**	**2 214 421**	**35 702 405**	**5 267 468**	**48 502 820**
	2013	**3 860 107**	**2 758 110**	**8 123 442**	**672 500**	**12 952 636**	**3 430 610**	**17 023 333**

Source: DMR, Directorate Mineral Economics

*** *Withheld*

PRICES

Nonferrous prices have been falling in the previous year due to slowing global economy, particularly the Chinese economy. However, despite the expectations that these metal prices would continue on a downward trend, most non-ferrous metal prices showed improvement in 2014, except for copper and lead. The average nickel and zinc prices increased by 12.4 and 13.1 percent to $16 884/t and $2 162/t, respectively in 2014, compared with 2013. Aluminium and cobalt also rose by 0.9 and 9.3 percent to $1 865/t and $14.4/lb, respectively. While copper and lead fell by 6.5 and 2.1 percent to $6 859/t and $2 095/t, this is attributed to the lack of demand for both metals.

EMPLOYMENT

Employment in the South African non-ferrous metals and minerals sector increased by a marginal 0.7 percent to 15 642 in 2014 compared with 15 535 employees in 2013 (Table 36), due to Tormin Mine, which started operating at the beginning of the year. The coming of a new mine on stream, offset jobs that were lost in other sectors, due to retrenchments. As a result, total remuneration also rose by 1.7 percent to R3.65 billion. The average remuneration per person also increased by one percent, to R233 247 from R231 028.

TABLE 36: SOUTH AFRICA'S NON-FERROUS METALS AND MINERALS: EMPLOYMENT AND GROSS REMUNERATION, 2009-2013

YEAR	EMPLOYEES	REMUNERATION	
	Number	R'000	Per Capita Payments
2010	15 805	3 573 415	226 094
2011	16 027	4 303 902	268 540
2012	15 573	4 154 738	266 598
2013	15 535	3 589 019	231 028
2014	15 642	3 648 455	233 247

Source: DMR, Directorate Mineral Economics

OUTLOOK

The Chinese economy is expected to grow by 3.8 percent in 2016, which is way below the growth rate of around 7.4 percent in 2014, slightly above 3.1 percent growth of 2015. This does not bode well for nonferrous metals, since China accounts for more than 40 percent of global demand for most key nonferrous metals. As a result of the slowing of the Chinese economy, demand for these minerals is expected to remain under pressure. Consequently, most nonferrous markets will remain oversupplied in the short term.

According to Moody's, base metal prices will continue to trade at lower levels, and expectations for slower growth and reduced demand could result in further downside risk for the sector. Slowing growth in China and muted conditions in Europe and a weak recovery in the US will continue to put pressure on global base metal prices. Weak global macroeconomic conditions and volatility in base metal prices have also dampened investor sentiment, putting additional pressure on the future growth.

South Africa's production of nonferrous minerals is expected to increase, due to new mines and expansion projects coming on stream. Consumption of these minerals is also expected to rise, particularly in the construction industry, which will benefit from the country's infrastructure programmes. Local beneficiation will also add to their consumption, mostly with antimony which is an input material for polymer production, its consumption is expected to surge by over 95 percent to 100 tpa.

REFERENCES

1. *Metal-Pages, various articles*
2. *Mineral Economics Directorate, DMR*
3. *www.kitco.com*
4. *IMF, World Economic Outlook, http://www.imf.org, Oct 2013*
5. *Creamer Media's Base Metals Report – December 2015*
6. *Thompson Reuters, GFMS Base Metals Review and Outlook*
7. *USGS, Mineral Commodity Summaries, 2015*

ANTIMONY

N Mahala

SUPPLY AND DEMAND

The US Geological Survey (USGS) estimated the world antimony reserves at 1.8 Mt in 2014. As indicated in Table 37, China had the biggest reserves in the world at 950 kt, followed by Russia's 350 kt and Bolivia's 310 kt. South Africa was ranked 5th, with its reserves amounting to 27 kt. In 2014, global supply marginally decreased by 2.1 percent to 160 kt compared with the year prior. The contraction in supply was in response to the subdued global economic growth which had a negative impact on antimony demand. This was exacerbated by the enforcement of environmental regulations and the crackdown on illegal mining in China which had a noticeable negative effect on global supply. China was by far the world's largest producer of antinomy responsible for 78 percent of total output in 2014, tailed by Russia's 4.4 percent and Bolivia's 3.1 percent; South Africa was responsible for only 0.5 percent.

TABLE 37: WORLD RESERVES AND PRODUCTION OF ANTIMONY CONCENTRATE, 2014

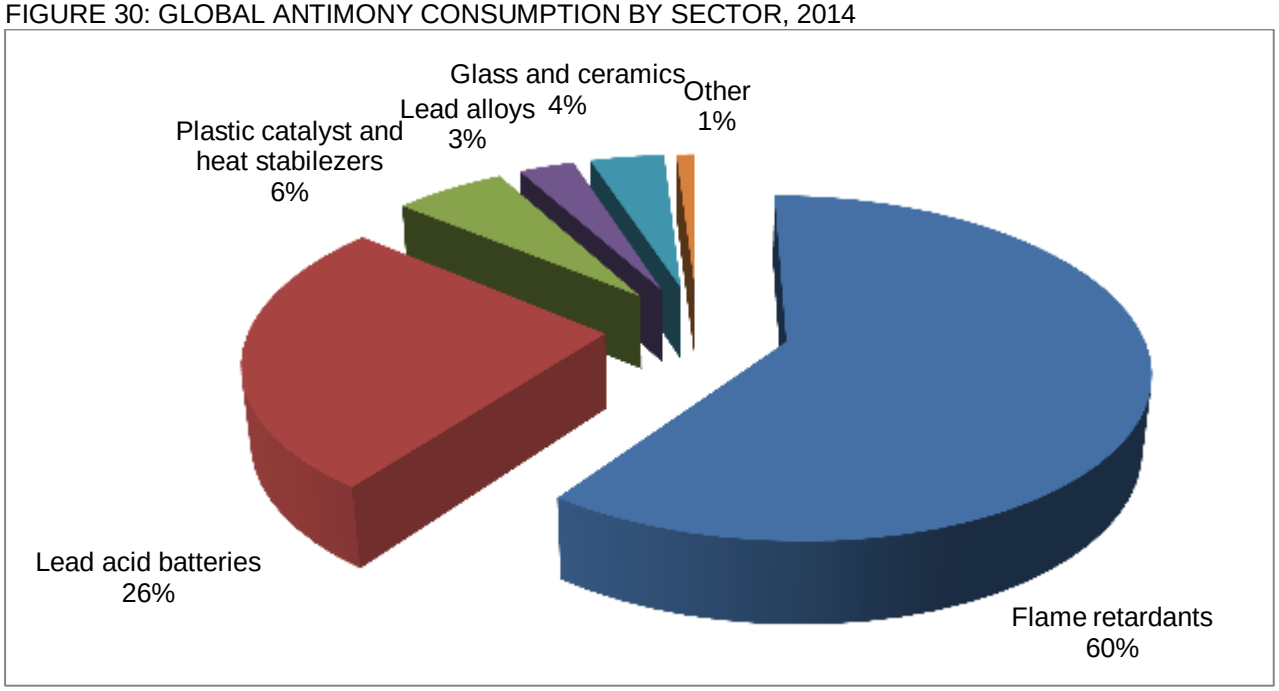
COUNTRY		RESERVE			PRODUCTION		
		kt	%	Rank	kt	%	Rank
Bolivia		310	16.9	3	5	3.1	3
China		950	51.7	1	125	78.1	1
Russia		350	19.0	2	7	4.4	2
South Africa		27	1.5	5	0.8	0.5	6
Tajikistan		50	2.7	4	4.7	2.9	5
Other		150	8.2	-	17.5	10.9	-
Total	**2014**	**1 837**	**100.0**		**160**	**100.0**	
	2013	**1 837**			**163.5**		

Source: USGS, Mineral Commodity Summaries, January 2015
DMR, Mineral Economics Directorate

Africa's antimony supply was broadly produced in South Africa at Consolidated Murchison Mine, which is the largest antimony mine outside China. South Africa's antimony production plummeted by 66 percent to 0.8 kt tonnes compared with 2.4 kt tonnes in 2013. Consolidated Murchison Mine performed way below its potential capacity of 5.5 kt per annum due to financial and technical constraints experienced by the mine over recent years and worsened in 2014.

In 2014, global antimony supply outstripped demand resulting in approximately 10 percent reduction in consumption to 144 kt compared with 160 kt consumption in 2013. The decline in consumption could be attributed to the fact that antimony trioxide consumers now prefer substitute materials such as hydrated aluminium oxides, which are less expensive. Substitutes came into the market in 2011 following a sharp increase in antimony prices. As a counter strategy, antimony producers were forced to significantly reduce prices.

FIGURE 30: GLOBAL ANTIMONY CONSUMPTION BY SECTOR, 2014



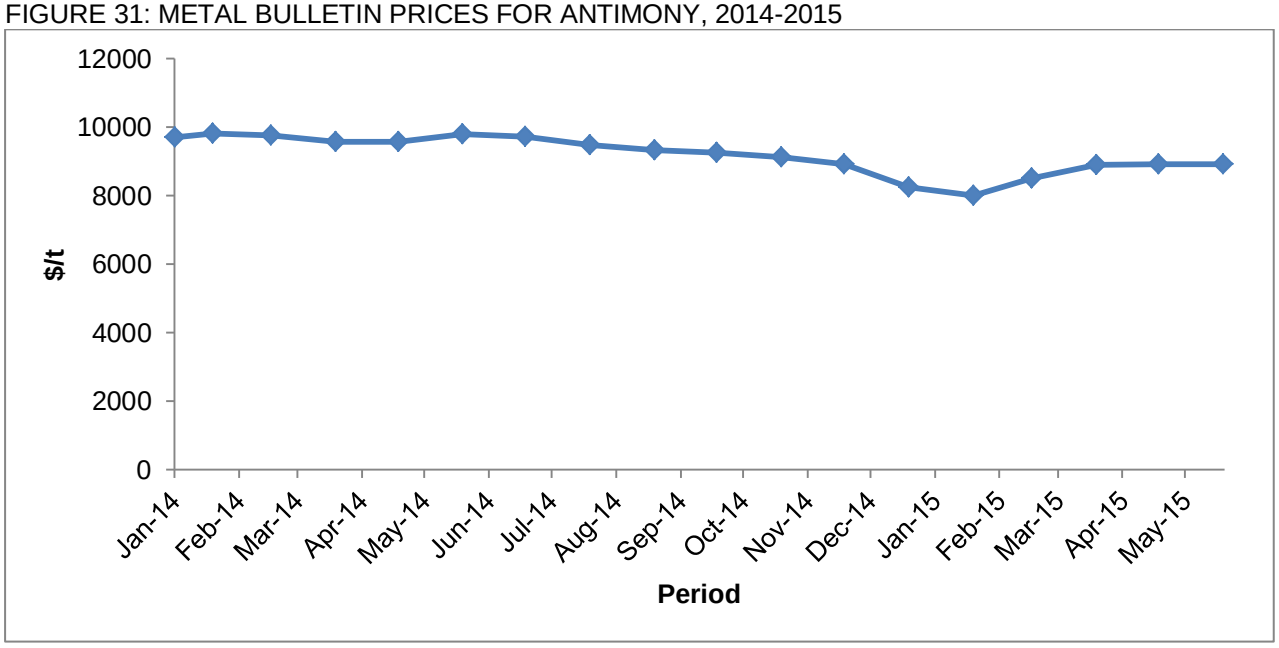
Source: Estimates from various sources

About 60 percent of antimony is used in the production of flame retardants, and the remainder finds applications in various end use products including; lead acid batteries, plastic catalysts and heat stabilizers, lead alloys and glass ceramics as depicted in figure 30.

PRICES

According to the Metal Bulletin, standard grade II antimony metal in the warehouse, Rotterdam, prices in first half of 2014 averaged between $ 9 500/t and $ 9 800/t and took a dip to average between $ 8 900/t to & $ 9 300/t in the second half of the same year due to weaker demand and an oversupplied global market (Figure 31). On a year on year basis, average antimony prices decreased by 8.7 percent to $ 9 446/t compared to $ 10 347.67/t recorded in 2013. Slight improvement in prices in the first half of 2015 were recorded which provided minor relief to antimony market.

FIGURE 31: METAL BULLETIN PRICES FOR ANTIMONY, 2014-2015



Source: Metal Bulletin warehouse, Rotterdam, 2014 – 2015

KEY DEVELOPMENTS IN SOUTH AFRICA

Consolidated Murchison Mine, the only antimony producer in South Africa has been faced with technical and financial challenges in recent times which resulted in production losses. This operation has the production capacity of about 5 500 tpa but output has been on the decline, with the mine recording production of 2 400 tpa and 815 tpa in 2013 and 2014 respectively. In 2013, the mine initiated a business rescue plan where its assets were to be traded to Stibium Mining. However, the deal was not successful due to differences between seller and buyer.

In February 2015 Consolidated Murchison Mine was placed under provisional liquidation and over 800 employees lost their jobs in the process. Thereafter, talks of selling the mine's assets to Stibium Mining resumed. According to Stibium Mining, feasibilities studies undertaken on Consolidated Murchison Mine assets were encouraging and identified bottlenecks and major challenges resulting in poor performance of the mine and some action plans were put in place to turnaround the situation at the mine. Currently negotiations are at an advance stage and the parties are convinced that the Consolidated Murchison Mine transaction will be finalized during the course of 2015.

Meanwhile, South African government through its Industrial Policy Action Plan (IPAP) 2014/15-2016/17 identified polymers' production as key manufacturing programme that must be pursued vigorously within mineral beneficiation programme. Antimony is the significant input ingredient in the manufacturing of polymers and therefore this beneficiation programme will have positive effect on local antimony demand.

EMPLOYMENT

South Africa's employment in the antimony sector fell by 6.4 percent to 810 employees compared with 865 employees in 2013. (Table 38). This declining trend has been relentless since 2012, and can be attributed to weaker global demand for the antimony metal and stagnant production performance by Consolidated Murchison Mine resulting in lay-offs. Although employment decreased, remuneration of employees and per capita earnings increased by marginal 0.5 percent and 8 percent to R 129 508 million and R 159 887,respectively .

TABLE 38: EMPLOYMENT AND REMUNERATION IN THE ANTIMONY SECTOR, 2014

YEAR	EMPLOYEE	REMUNERATION	
	Number	R'000	Per Capita Earnings
2010	942	91 630	97 272
2011	971	121 015	124 629
2012	957	131 687	137 604
2013	865	128 871	147 827
2014	810	129 508	159 887

Source: DMR, Mineral Economics Directorate

OUTLOOK

Global economy growth remained weak and commodity prices were in a free fall creating liquidity and capacity oversupply in the markets throughout 2014. The biggest consumer of antimony, China, has been experiencing economic slowdown with growth rates expected to slow down to 6.5 percent in 2015, down from 7.5 percent recorded in 2014. Prices of commodities are not expected to improve in the short term and as result many operations, in particular small and high cost operations, will find it difficult to operate under these circumstances and might be forced to shut down. Antimony prices are expected to remain weak in 2015 averaging $ 9 400/t and expected to increase by 4 percent to average $ 9 800/t in 2016. In the long term, prices are expected to pick up, with economic analysts predicting that antimony prices will increase up to $ 20 000/t by 2020.

Recent studies suggest that Chinese supremacy in the antimony market is cracking due to ore depletion in major mining regions, particularly in Hunan province and vigorous crackdown on illegal miners and

enforcement of environmental regulations that resulted in shut downs on some mining and smelting operations. These developments should be welcomed within the antimony value chain market because they create an opportunity for investment outside China. Major development projects have been on hold for many years because antimony market was flooded by Chinese supply.

In the medium to long term, potential new antimony projects and expansions in South Africa, North America, Australia, Georgia, Italy, Laos, Russia, Turkey and other areas will be able to enter the market as the environment is becoming more conducive. Global antimony supply could increase by 14 000 tpa as result of new mines coming online. It is anticipated that South Africa's production could increase to over 6 000 tpa by 2016 if the Cons. Murch Mine/Stibium deal is successful.
Global demand for antimony is expected to remain stagnated in 2015 due to the oversupplied market which will force prices to remain relatively low as seen in 2014. Nonetheless oversupply is expected to continue over the short term. There are several new projects which were planned to come on stream but without a strong price/demand incentive, they are likely to be placed on hold until the market situation improves. The success of these projects will be determined by cost competitiveness and integration potential.

South Africa's demand for antimony is expected to increase in medium term as the country embarks on the re-industrialisation programme, with antimony earmarked as input material for polymer production within the mineral beneficiation programme. Polymers are one of the strategic value chain targeted for immediate implementation. In this regard, antimony is a key input in the production of polymers in the form of flame retardant. In medium term South Africa's antimony consumption is expected to increase by over 95 percent to 100 tpa.

REFERENCES

1. *Metal Bulletin, prices 2014-15*
2. *USGS, Mineral Commodity Summaries, January 2015*
3. *Industrial Minerals, Rock of Changes, May 2015 and various release statements*
4. *Andrew Topf, 2013, Antimony: Put it on your radar, Exclusive Investing News, July 2013*
5. *Roskill, Quarterly Review, April 2015*
6. *Judith Chegwidden Jack Bedder,2012,Antimony: Changes in the pattern of supply and demand, Roskill Information Services Ltd*

COBALT

L Ramane

SUPPLY AND DEMAND

World cobalt reserves amounted to 7.2 Mt in 2014 (Table 39). The Democratic Republic of Congo (DRC) at 47.2 percent, still hosted the world's largest cobalt reserves, followed by Australia's 15.3 percent and Cuba's 6.9 percent. Approximately 50 percent of cobalt was produced from the nickel industry, 44 percent from copper and other sources, with only 6 percent produced from primary sources.

World cobalt production increased by 1.8 percent to 112 kt in 2014, compared with 110 kt in 2013 (Table 39), due to production from new projects and expansions to existing operations. The DRC was the world's largest producer of cobalt accounting for 50 percent, followed by China's 6.4 percent and Canada's 6.3 percent. South Africa, at 1.2 percent was ranked 11th.

TABLE 39: WORLD RESERVES AND MINE PRODUCTION OF COBALT, 2014

COUNTRY	RESERVES			MINE PRODUCTION		
	kt	Percent	Rank	t	Percent	Rank
Australia	1 100	15.3	2	6 500	5.8	4
Brazil	85	1.2	9	3 000	2.7	9
Canada	250	3.5	6	7 000	6.3	3
China	80	1.1	10	7 200	6.4	2
Cuba	500	6.9	3	4 200	3.8	6
DRC	3 400	47.2	1	56 000	50.0	1
New Caledonia	200	2.8	8	2 800	2.5	10
Philippines	270	3.8	4	3 700	3.3	7
Russia	250	3.5	6	6 300	5.6	5
South Africa±	32	0.4	11	1 332	1.2	11
Zambia	270	3.8	4	3 100	2.8	8
Other	763			10 868		
TOTAL 2014	**7 200**			**112 000**		
2013	**7 200**			**110 000**		

Sources: USGS, January 2014
±DMR, Mineral Economics Directorate (mine production)
-unknown

South Africa's cobalt is derived from nickel and platinum-group metals (PGMs) mining. Cobalt production increased by 2.9 percent to 1 332 t in 2014, compared with 1 294 t in 2013 due to continued improvements with plant recoveries and efficiencies (Table 40).

TABLE 40: SOUTH AFRICA'S LOCAL AND EXPORT SALES OF COBALT, 2005-2014

YEAR	PRODUCTION	LOCAL SALES			EXPORT SALES		
		Mass	Value (FOR)		Mass	Value (FOR)	
	t	t	R' 000	R/t	t	R' 000	R/t
2005	268	33	4 439	136	241	51 615	214
2006	267	44	8 882	200	221	46 975	213
2007	307	30	10 578	350	249	99 539	400
2008	244	43	26 231	608	261	167 774	642
2009	238	75	20 435	272	183	63 181	346
2010	840	58	16 110	278	493	135 424	275
2011	862	43	10 789	251	450	114 457	254
2012	1 102	33	7 439	227	614	147 320	240
2013	1 294	51	11 868	233	740	193 226	261
2014	1 332	50	16 754	335	753	243 954	324

Source: Directorate Mineral Economics, DMR

World refined cobalt production increased by 6.8 percent to 91.75 kt in 2014, compared with 84.9 kt in 2013 Table 41), due to increased production from China, Japan, Finland and Madagascar (Table 41). China, at 42.7 percent, remained the largest global refined cobalt producer, followed by Finland's 12.4 percent and Belgium's 6.4 percent. African countries account for approximately, 14.5 percent of global refined cobalt supply.

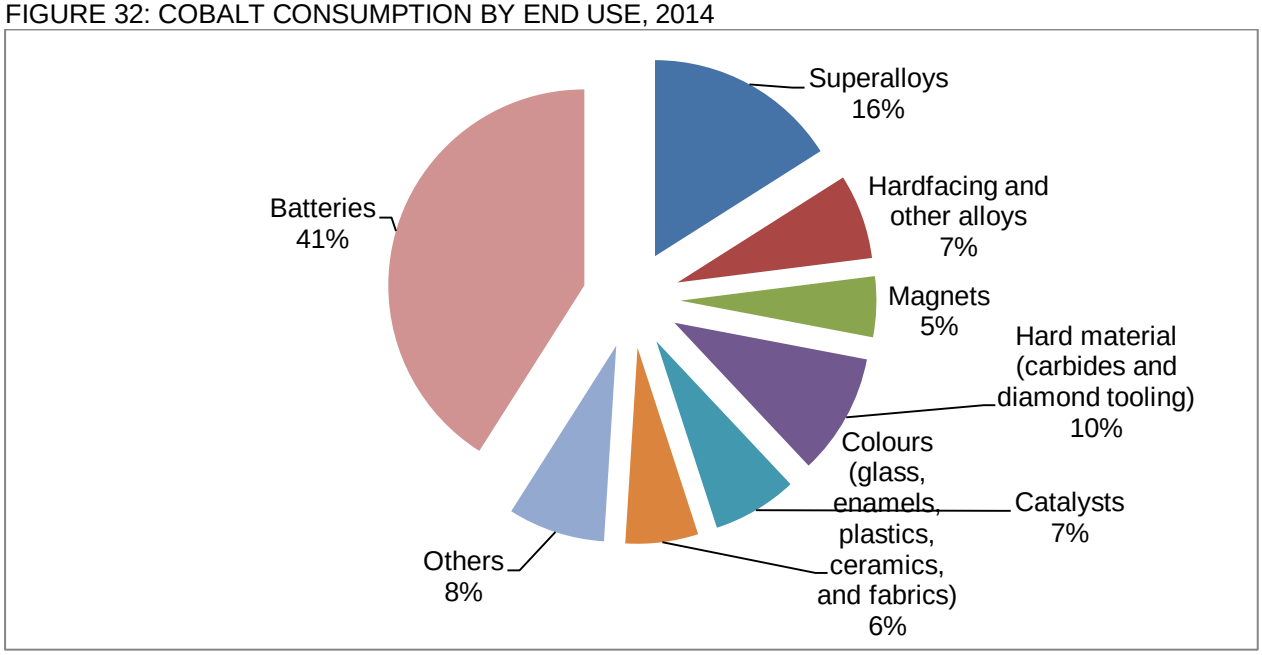
TABLE 41: REFINED COBALT PRODUCTION BY COUNTRY, 2013 AND 2014

COUNTRY	2013		2014		
	t		t		Rank
Australia	4 981	5.8	5 400	5.9	4
Belgium	5 415	6.3	5 850	6.4	3
Canada	5 559	6.5	5 250	5.7	5
China	36 062	42	39 300	42.8	1
D R of Congo	3 000	3.5	3 300	3.6	9
Finland	10 010	11.7	11 450	12.5	2
Japan	2 747	3.2	3 650	4.0	7
Madagascar	2 083	2.4	2 950	3.2	10
Morocco	1 353	1.6	1 400	1.5	12
Norway	3 400	4	3 600	3.9	8
Russia	2 368	2.8	2 300	2.5	11
South Africa*	1 294	1.5	1 350	1.5	13
Zambia	5 000	5.8	4 300	4.7	6
Other	2 632	3.1	1 900	2.1	
TOTAL	**85 904**	**100.0**	**91 754**	**100.0**	

Source: Cobalt News April 2015
**Mineral Economics Directorate, DMR*

World cobalt demand in 2014 amounted to approximately 81 kt. Asia's demand increased by almost 10 percent driven by rising demand for superalloys, particularly in aerospace applications. A slight improvement also came from Europe and America. Rechargeable batteries are still the largest consumer of cobalt accounting for 41 percent of the total cobalt demand. It is followed by superalloys (16 percent) and hard metals (10 percent) as depicted in figure 32.

FIGURE 32: COBALT CONSUMPTION BY END USE, 2014



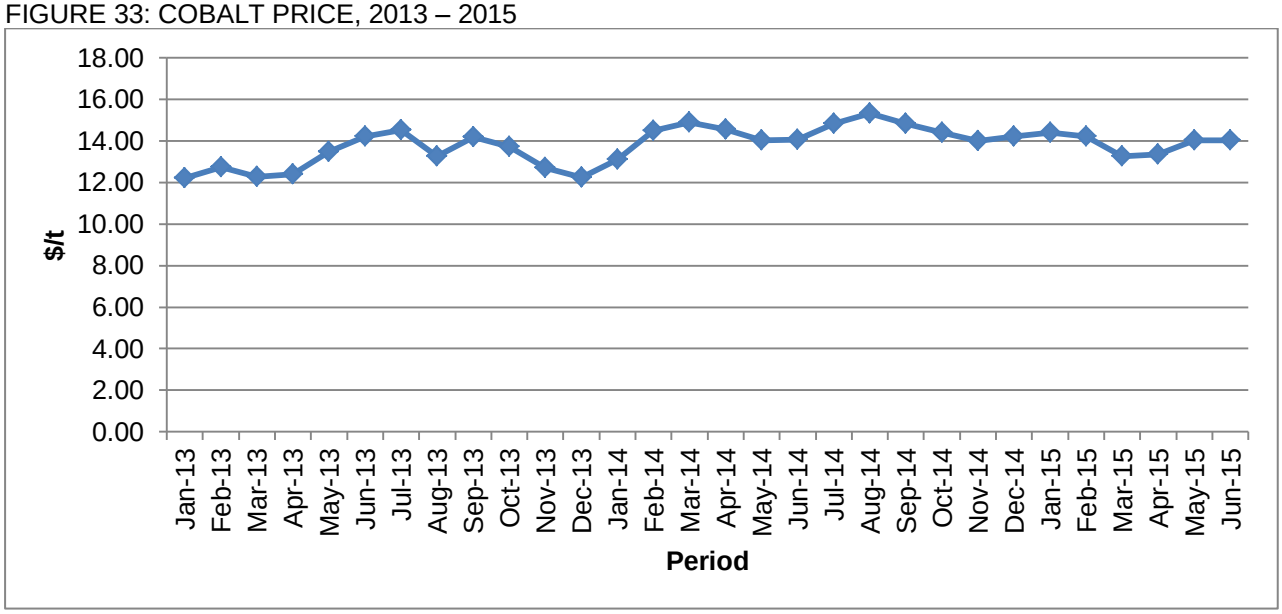
Source: Cobalt Facts 2015

In 2014, approximately 94 percent of cobalt output in South Africa was exported, with the balance consumed locally. Local sales volumes fell by 2 percent to 50 t, compared with 51 t in 2013, due to the lack of demand from local consumers (Table 41). Domestically, cobalt is used in the manufacturing of alloys in the aircraft industry and in batteries, as well as catalyst in the gas-to-liquid process.

PRICES

In recent years cobalt production has been higher than consumption and this has put pressure on the cobalt price. The cobalt price increased from an average of $13.17/lb in 2013 and to an average of $14.40/lb in 2014, despite the oversupplied market. Prices peaked to $15.34/lb in August 2014, however the improvements were short lived and the price fell to $14.01/lb by November of the same year. The price slightly increased in 2015, reaching $14.41 in January 2015; however by the end of May, the price was around $14.01/lb again (Figure 33).

FIGURE 33: COBALT PRICE, 2013 – 2015



Sources: Metal Bulletin

In spite of the weak global cobalt prices, South Africa's local and export unit sales values increased by 43.8 and 24.1 percent in 2014 to R335/t and R324/t, respectively. This was due to higher unit sales. Local and export sales revenues increased by 41.2 and 26.3 percent to R16.7 million and R243 million in 2014, respectively.

KEY DEVELOPMENTS

In a bid to increase domestic refining of copper and cobalt products and decrease exports of unrefined materials, the government of the DRC was planning to introduce a ban on concentrates. However the proposed export ban on concentrates which was planned for 2013, and postponed to January 2015 still has not materialized. The postponement was a result of the lack of electricity to process the minerals domestically. However, companies will still need to pay a $100\t from US$60/t tax on concentrated exports.

Table 42 below gives a summary of projects in the global cobalt industry. Since in South Africa, cobalt is produced as a by-product, any recent developments will be discussed in the related chapters (Nickel and PGM's).

TABLE 42: GLOBAL PROJECTS OF COBALT, 2014

NAME	COUNTRY/ REGION	OPERATORS/ OWNERS	POTENTIAL START YEAR	COBALT PRODUCTION (TONS)	PROJECT COST
Kolwezi project	Democratic Republic of Congo(DRC)	Telferscot Resources Inc's			
Nico gold-cobalt-bismuth-copper project	Canada	Fortune Minerals		1 615	CDN$110 million
Musonoi Project	DRC	Metorex		10 000	
Sherritt's Ambatovy operation	Madagascar	Ambatovy	2015	2000-3000 Mt refined cobalt	
Kola refinery	Russia	Norilsk	2015	3000	
Boleo	Mexico	MMB/Consort	2015	2000	

Sources: Darton Commodities Limited and other various sources

OUTLOOK

The cobalt market has been oversupplied since late 2009 and remains in surplus. However, this situation is expected to continue through 2015 and 2016, as new projects come on stream and expansions continue. However, there are no new projects that are expected beyond 2016, this will significantly tighten the supply/demand balance beyond 2017, as demand for cobalt continues to increase. Demand for cobalt is expected to grow by approximately 5 percent until 2025, driven by increasing demand for rechargeable batteries and super alloys in the aerospace industry. Higher demand and lack of new supply will lead to increased cobalt prices in the last quarter of this decade.

Cobalt prices are expected to continue trending downwards in 2015, with the ramping up of new projects in Madagascar and the Philippines, bringing additional material into the market and compounding the current oversupply situation.

South Africa's cobalt production is expected to continue growing, as a result of increased supply of nickel and PGMs. Platinum production alone is expected to upsurge to 2.5 million ounces by 2017. The high demand for cobalt will also boost export earnings, which will have a positive impact on the country's GDP.

REFERENCES

1. *CDI Cobalt facts: supply and demand 2014*
2. *Creamer Media: A Review of SA's Platinum Sector 2015*
3. *Darton Commodities Limited, Cobalt Market Review 2014-2015*
4. *Directorate Mineral Economics, DMR*
5. *Metal bulletin, prices*
6. *U.S. Geological Survey, Mineral Commodity Summaries, January 2015*
7. *http://www.miningweekly.com/article/looming-cobalt-market-deficit-to-spur-investment-interest-2015-08-07*
8. *Roskill Cobalt: Market Outlook to 2018*
9. *http://www.miningnewsmagazine.org*
10. *http://www.bloomberg.com*

COPPER

S Mnyameni

SUPPLY AND DEMAND

In 2014, global copper reserves were estimated at 700 Mt. Chile, at 29.9 percent, held the largest reserves, followed by Australia (13.3 percent), Peru (9.7 percent) and the USA (4 percent). South Africa accounted for 1.6 percent of world reserves and was ranked 11th (Table 43).

World copper mine production increased by 2.2 percent to 18.7 Mt in 2014 compared with 18.3 Mt in 2013, according to United States Geological Survey (USGS). This increase was mainly as a result of recovery in production at mines in Indonesia, after the lifting of a ban on concentrate exports, and the ramp-up in production on new projects particularly from Chile. Chile continued to be the world's largest copper mine producer, contributing 5.8 Mt to total output, followed by China at 1.6 Mt and Peru at 1.4 Mt. In the continent, Democratic Republic of Congo, South Africa and Zambia were the largest producers of copper collectively contributing 1.9 Mt to global output.

TABLE 43: WORLD RESERVES AND MINE PRODUCTION IN 2014

COUNTRY	RESERVES			PRODUCTION		
	Mt	%	Rank	kt	%	Rank
Australia	93	13.3	2	1000	5.3	6
Canada	11	1.6	11	680	3.6	9
Chile	209	29.9	1	5 800	31	1
China	30	4.3	5	1 620	8.7	2
DRC	20	2.6	9	1100	5.9	5
Indonesia	25	3.6	8	400	2.1	12
Kazakhstan	6	0.9	13	430	2.3	10
Peru	68	9.7	3	1 400	7.5	3
Poland	28	4	7	425	2.3	11
Russia	30	4.3	5	850	4.5	7
South Africa	11	1.6	11	79	0.4	13
USA	35	4	4	1 370	7.3	4
Zambia	20	2.6	9	730	3.9	8
Other	114	16.3	-	2 816	15.1	-
TOTAL 2014	700	100.0		18 700	100.0	
2013	680	-	-	18 294	-	-

Sources: USGS, February 2015
Directorate Mineral Economics: Copper concentrate

In South Africa, copper is produced from one primary mine and as a by-product of Platinum Group Metals (PGM's) and zinc mining. The country's copper production decreased by 2.5 percent to 79 kt in 2014 compared with 2013 (Table 44). This was mainly due to consistent lower grade ore from Palabora Copper which resulted in the fast tracking of Lift I life to December 2015. Production from PGM's mines increased by 17.8 percent to 30 kt which offset the 12 percent decrease from primary sources as well as a 7 percent decrease from zinc mines.

TABLE 44: SOUTH AFRICA'S PRODUCTION, LOCAL SALES AND EXPORT OF COPPER 2004-2014

YEAR	PRODUCTION	LOCAL SALES			EXPORT SALES		
	Mass	Mass	Value (FOR)		Mass	Value (FOR)	
	kt	kt	R'000	R/t	kt	R'000	R/t
2004	103	84	1 542 829	18 381	29	583 293	16 495
2005	99	82	1 926 378	23 496	30	656 721	21 882
2006	110	84	3 892 035	46 452	24	1 064 092	43 598
2007	113	77	4 025 725	52 242	36	1 772 305	49 683
2008	97	68	4 120564	6 0168	33	1 507 356	45 860
2009	93	68	2 835 737	41 695	27	1 022 782	38 152
2010	84	57	3 160 029	55 750	25	1 209 297	48 718
2011	89	60	3 937 749	65 168	26	1 495 100	58 581
2012	70	55	3 575 956	65 454	27	1 598 770	59 562
2013	81	57	4 090 333	72 358	26	1 760 669	67 104
2014	79	45	3 483 784	77 411	37	2 466 769	67 242

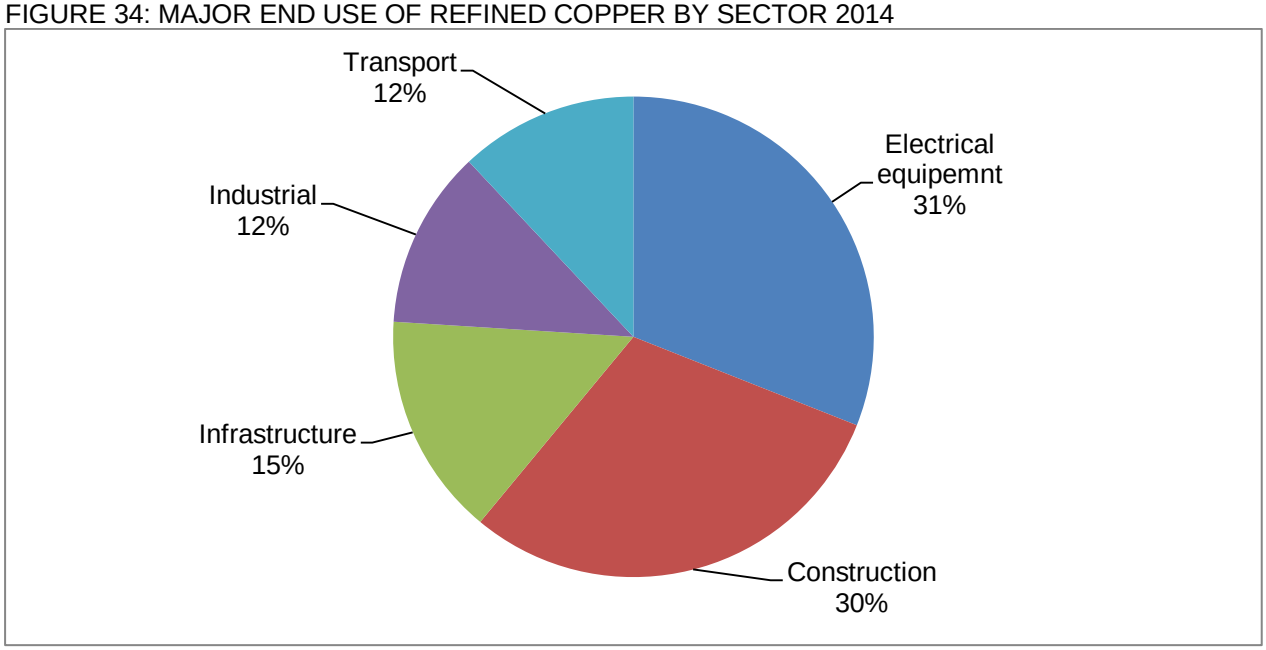
Sources: Directorate Mineral Economics, 2014

Notes: Exports include cathode. Blister and concentrates. The mass shown is that of metal and contained metal

Global refined copper production increased by 5.6 percent to 22.5 Mt compared with 21.3 Mt in 2013 as result of a 15 percent increase in output from China. India, DRC, Japan and the United States also increased production while Indonesia, Kazakhstan and Zambia recorded declines in output. Regionally, Africa's refined copper production rose by 8.8 percent while Asia and Oceania recorded increases of 7.7 percent and 7.4 percent, respectively. Other regions that recorded production increases according to CRU were the Americas (4.7 percent) and Europe (4 percent).

Global demand for copper rose by 9 percent to 22.9 Mt in 2014, due to growth from Asia's industrial sector offsetting the rest of the world where consumption remained subdued. Copper consumption was dominated by China and Europe, accounting for 44 percent and 14 percent of world usage, respectively, according to International Copper Study Group (ICSG). China's strong growth was from electricity transmission infrastructure from solar and wind farms in the central and western parts of the country to the cities in the east.

FIGURE 34: MAJOR END USE OF REFINED COPPER BY SECTOR 2014



Source: International Copper Study Group, 2015

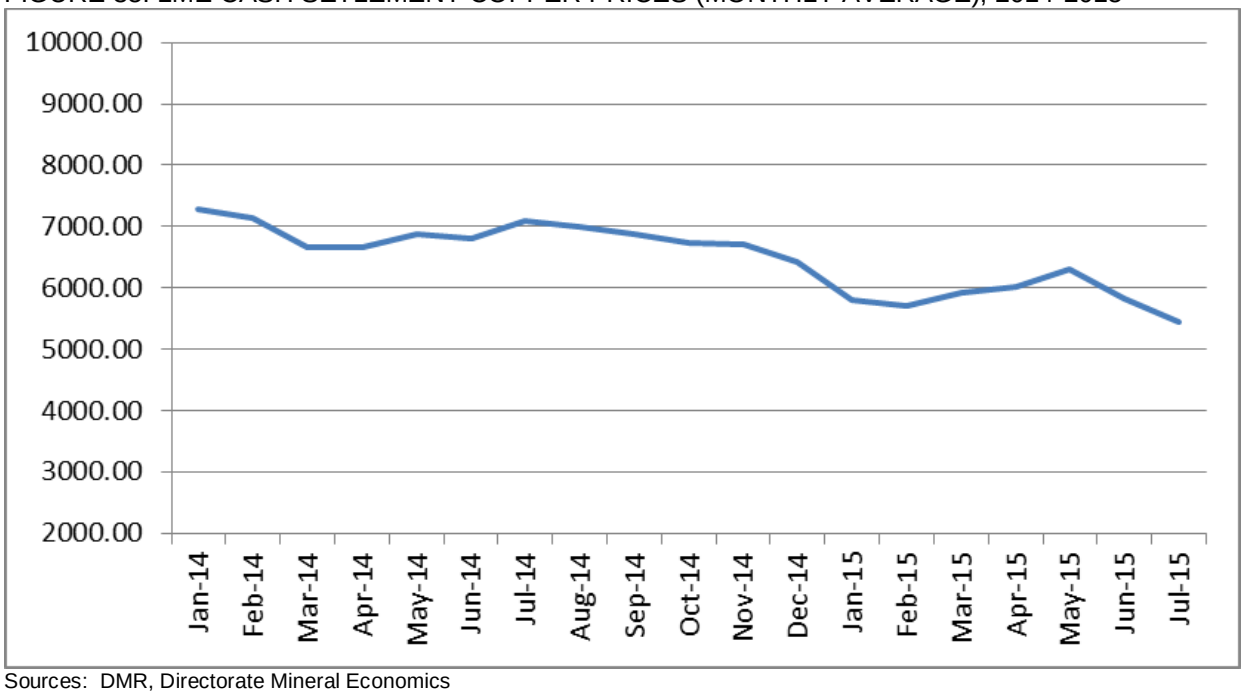
A total of 31 percent of the world's copper was used in the manufacture of electric equipment and 30 percent in the construction sector (Figure 34). Infrastructure sector accounted for 15 percent, while transport and industrial sectors consumed 12 percent each.

In South Africa, local consumption decreased by 21.1 percent to 45 kt compared with 57 kt recorded in 2013, due to slower industrial activity in the country. Export sales increased by 42.3 percent to 37 kt compared with 26 kt recorded in 2013. About 50 percent of copper rod sold locally is converted into copper cables, 26 percent consumed is domestic wiring while about 9 percent is consumed in the automobile industry. The remainder of local copper output is used in the transformer, telecommunication, cord sets transportation and other segments.

PRICES

In 2014, copper prices struggled to recover from the first quarter slump and continued to trend downward throughout the second half of the year. Annual London Metal Exchange (LME) copper cash settlement price, on average, decreased by 6.5 percent to $6 860/t compared with 2013 (Figure 35). This was due to the slowdown in global economic growth particularly in China and the economic turmoil in Europe as well as a supply surplus in the global copper market. The depressed copper market put pressure on the LME prices ending the year on a four year low of $6 423 /t in December 2014, marking the beginning of a declining trend into 2015.

FIGURE 35: LME CASH SETLEMENT COPPER PRICES (MONTHLY AVERAGE), 2014-2015



Sources: DMR, Directorate Mineral Economics
London Metal Exchange (LME)

Despite a 7 percent increase in local unit values to R72 411 /t (Table 44), revenues generated from local sales decreased by 14.8 percent to R3 484 billion, as a result of lower local sales volumes. While export unit values slightly improved by a marginal 0.2 percent to R67 242 /t, revenues generated went up by 40.1 percent to R2.47 billion due to higher export volumes as a result of increased demand.

EMPLOYMENT

South Africa's primary copper mines employed 3 536 people in 2014 (Table 45), representing an increase of 1.8 percent year on year. This was largely ascribed to expansion projects at Palabora Copper Limited.

TABLE 45: EMPLOYMENT AND REMUNERATION IN SOUTH AFRICA'S COPPER MINES IN 2014

YEAR	EMPLOYEE	REMUNERATION	
	Average Number	R'000	Average Earning (R/Employee)
2010	3 540	839 712	237 207
2011	3 638	1 058 697	291 011
2012	3 487	1 163 107	333 555
2013	3 474	1 243 166	357 849
2014	3 536	1 294 225	366 014

Sources: DMR, Directorate Mineral Economics

Total remunerations increased by 4.1 percent to R1.29 billion resulting in a 2.3 percent increase on average earnings per employee to R366 014 per year. The incorporation of female employees continued its upward trend, increasing by 9.4 percent to 385 from 352 employees in 2013. Employee's productivity decreased by 4 percent to 22 t/employee compared with 23 t/employee in 2013.

KEY DEVELOPMENTS

Palabora Copper (Pty) Limited, a consortium led by Industrial Development Corporation (IDC) of South Africa and China's Hebei Iron & Steel Group, located in the town of Phalaborwa in Limpopo Province, South Africa, is undertaking the development of an underground Lift II project at an investment capital of R9.3 billion. The project is an extension 450 m below the almost depleted Lift I. The project is expected to create 2000 jobs during the construction stage where non-skilled and semi-skilled are exclusively reserved for local communities. Lift II project has a potential to extend the life of mine till 2033 with the first ore expected to be brought on surface in 2017 at a capacity of 120 kt of copper per annum.

South African government has prioritised spending on economic infrastructure such as roads and transport, electricity, and water and sanitation, and has budgeted a revised R813 billion over the current medium term expenditure framework (MTSF). Within this budget, R18 billion is budgeted for energy infrastructure to support the Integrated National Electrification Programme for 2015/16 and 2017/18 financial years. This programme will include the electrification of 810 000 on-grid and 65 000 non-grid household as well as building 12 power substations, upgrading 18 other substations, erecting 330 km medium-voltage power lines and upgrading 285 km power lines.

In the region, African Minerals Barbados Limited, a subsidiary of Ivanhoe Mines, has discovered a very large strati form copper deposit located in Kolwezi district, Katanga in the Democratic Republic of Congo (DRC). Ivanhoe Mines holds a 95 percent stake in Kamoa projects and the remaining 5 percent is transferred to the DRC government. With an estimated resources of approximately 739 Mt grading at 2.67 percent of copper, Kamoa project is regarded as the Africa's largest high grade copper discovery and the world's biggest higher grade undeveloped copper discovery. The development of Kamoa project will follow a two phased approach. The first phase is aimed at developing an underground mine and mining the high grade copper from the shallow resources to produce a 3 Mt per annum feeding a concentrator to yield high value concentrate. In terms of capital investment, Ivanhoe Mines has signed an agreement with a China's Zijin Mining Group, through its subsidiary Gold Mountain International Company Limited, to co-develop the project. Zijin will buy a 49.5 percent share interest in the Kamoa project for $406 million and arrange financing for the project's first phase. According to preliminary economic assessment, approximately $1.4 billion capital investment is required for the development of Kamoa's first phase where 100 kt of copper concentrate is expected to be produced. The proposed second phase will follow after 5 years with a major expansion of mine and mill and the construction of onsite smelter with a capacity to produce about 300 kt per annum of blister copper. The Kamoa project has an estimated life of 30 years and is expected to come on stream in 2017.

OUTLOOK

Despite challenges of lower grade ore, electricity and water shortages faced by the world's largest copper producer, Chile, stronger contributions from ramp-up operations will make a positive impact and new mines will boost global volumes. World mine production is expected to grow by 3 percent to 19 Mt in 2015 and a further 5 percent to 20.3 Mt in 2016, according to the ICSG.

In 2015, world refined copper production is expected to increase by 3 percent to 23.1 Mt and by further 5 percent in 2016, according to ICSG. The stronger US economy particularly the housing sector will lead to higher copper consumption albeit not enough to counter the weakening global trends. The global expansion of renewable energy is expected to increase the demand for the red metal in the next decade.

Copper prices are likely to remain on a downward trend in 2015, reaching record lows as a result of market surplus as well as concerns about China's economic performance as the world's biggest consumer. The build-up of LME inventories signals the weakening fundamentals of copper markets which precede falling of prices. Copper prices are expected to be relatively lower, reaching a six year low record mark of $5 000 /t in 2015 taking into consideration the current global economic growth.

Over 50 percent of the total copper produced in South Africa is consumed locally. Eskom, the biggest consumer of copper, is anticipated to benefit significantly from the infrastructure programmes, which are copper intensive. This will likely drive local demand for copper up and the completion of Palabora Copper's expansion project is timed well to supply the anticipated increased demand.

REFERENCES

1. *Creamer Media: Base Metals Report, December 2015*
2. *International Copper Study Group, Copper Market Forecast 2014-2015*
3. *London Metal Exchange (LME)*
4. *U.S Geological Survey, Mineral Commodity Summaries, January 2015*
5. *Monitor CRU: Copper*

LEAD

S Mnyameni

SUPPLY AND DEMAND

Despite the recent increase in lead consumption, the discovery of new reserves is growing and there is more lead available in the world than any other time in the past. In 2014, global lead reserves were estimated at 87 Mt by the United States Geological Survey (USGS). Australia, at 40 percent, hosted the world's largest reserves followed by China (16 percent), Russia (11 percent) and Peru (8 percent). South Africa, with only 0.3 percent of the world total was ranked 10th (Table 46).

World lead mine production decreased by 2.2 percent to 5 314 kt in 2014 compared with 5 433 kt in 2013, according to the International Lead and Zinc Study Group (ILZSG). The drop in global lead mine production was mainly a consequence of a 4.8 percent reduction in China's output. The increase in Australia, Peru, Sweden and the United States (US) were offset by reductions in Bolivia, Canada, South Africa and Turkey (Table 46). Africa collectively accounted for 1.4 percent (77 kt) of the world total. South Africa, at 29 kt, had the continent's largest lead mine production followed by Morocco at 24 kt.

TABLE 46: WORLD RESERVES AND MINE PRODUCTION OF LEAD, 2014

COUNTRY	RESERVES			PRODUCTION		
	Mt	%	Rank	kt	%	Rank
Australia	35	40.2	1	733	13.8	2
China	14	16.1	2	2 713	51.1	1
India	3	3.4	7	112	2.1	7
Ireland	0.6	0.7	9	40	0.8	9
Mexico	6	6.9	5	250	4.7	5
Morocco	0.1	0.1	11	24	0.5	11
Peru	7	8	4	278	5.2	4
Russia	9.2	10.6	3	164	3.1	6
South Africa	0.3	0.3	10	29	0.5	10
Sweden	1.1	1.3	8	71	1.3	8
USA	5	5.7	6	367	6.9	3
Other	5.7	6.6	-	533	10	-
TOTAL	87	100	-	5 314	100	-

Sources: ILZSG, Session/Forecast April 2015
USGS, Mineral Commodity Summaries January 2015
DMR, Directorate Mineral Economics

South Africa's lead mine production decreased by 30.9 percent to 29 kt in 2014 compared with 42 kt in 2013. The decrease in production was due to lower head grade realised throughout the year. As a consequence, export sales decreased by 13.2 percent to 33 kt in 2014 compared with 2013 (Table 47). South Africa exports all its lead mine production to China, France and Switzerland.

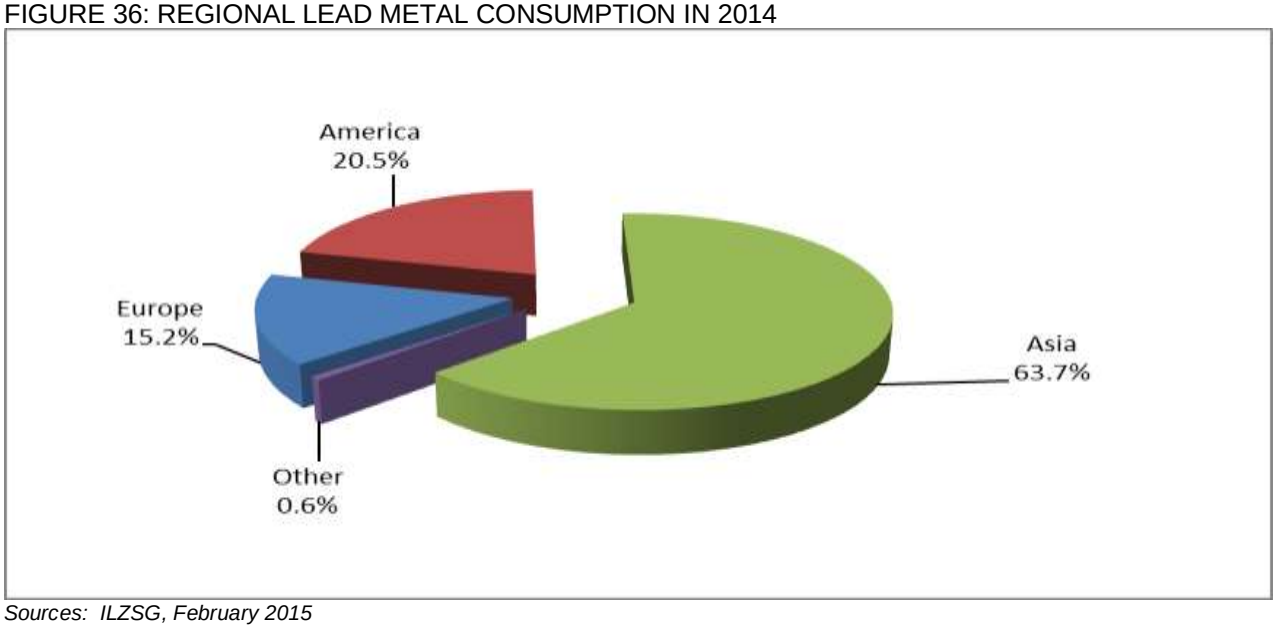
TABLE 47: SOUTH AFRICA'S PRODUCTION, LOCAL SALES AND EXPORTS OF LEAD 2004-2014

YEAR	PRODUCTION	LOCAL SALES			EXPORT SALES		
	Mass	Mass	Value (FOR)		Mass	Value (FOB)	
	kt	t	R'000	R/t	kt	R'000	R/t
2004	37	-	-	-	31	120 599	3 895
2005	42	-	-	-	47	211 458	4 497
2006	48	-	-	-	46	313 232	6 809
2007	42	-	-	-	37	492 678	13 315
2008	46	-	-	-	50	612 042	12 180
2009	49	-	-	-	44	482 903	11 002
2010	51	-	-	-	53	696 738	13 123
2011	54	-	-	-	52	762 929	14 569
2012	52	-	-	-	54	811 498	15 132
2013	42	-	-	-	38	683 219	18 066
2014	29	-	-	-	33	659 777	19 765

Source: DMR, Directorate Mineral Economics

Despite reductions in output from Peru and the US following the closure of operations at La Oroya in June 2014 and Herculaneum in December 2013 respectively, global refined lead production increased by 1.4 percent to 11 274 kt compared with 11 121 kt in 2013. This was primarily due to higher production in China, India, Italy, Kazakhstan and the Republic of Korea. World refined lead metal consumption grew by 1.4 percent to 11.28 Mt in 2014 compared with 11.12 Mt in 2013. Asia continued to dominate global lead consumption accounting for 63.7 percent, followed by the America's 20.5 percent and Europe's 15.2 percent (Figure 36). Africa's consumption declined by 1 percent to 99 kt in 2014 and contributed 0.9 percent to global lead usage. South Africa dominated Africa's consumption accounting for 66.7 percent of the continent's usage, followed by Algeria at 11.1 percent.

FIGURE 36: REGIONAL LEAD METAL CONSUMPTION IN 2014



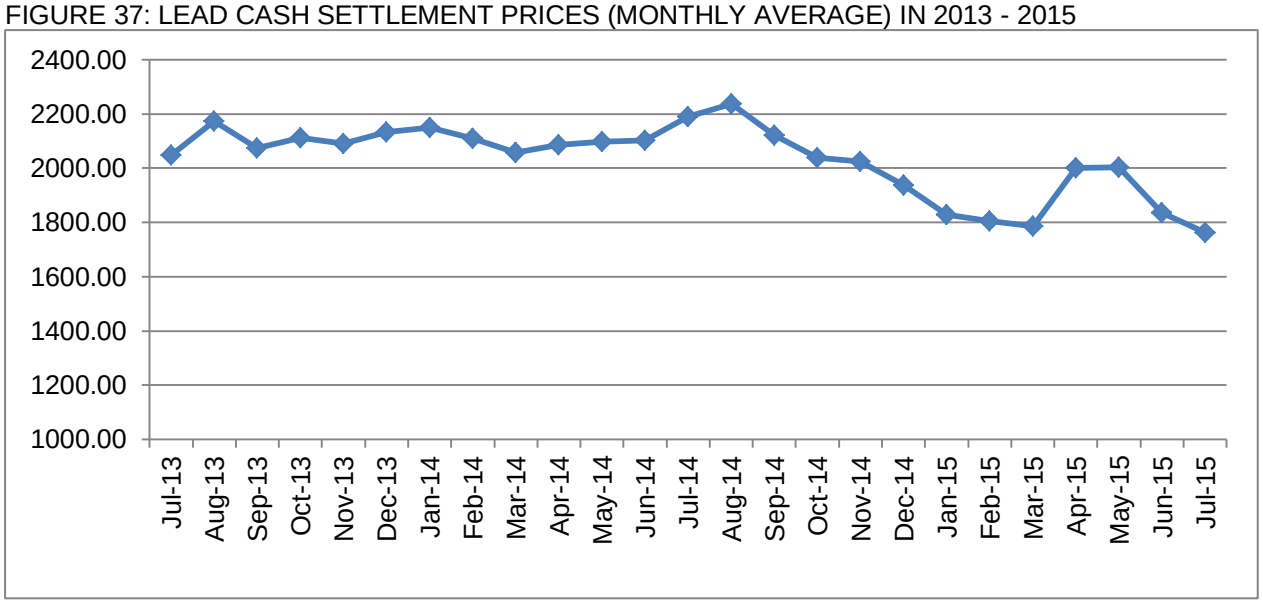
Sources: ILZSG, February 2015
DMR, Mineral Economics Directorate

PRICES

In the first half of 2014, lead prices were relatively stable before they plummeted in the second half of the year reaching a 2 year low in December. The annual London Metal Exchange (LME) lead prices averaged $2 095.67/t in 2014, a 2.1 percent decrease compared with 2013. This might be attributed to the new available substitute of the lead-acid batteries by lithium-ion batteries which has claimed a bigger share in the e-bike market. Prices peaked in August 2014 at $2 236.58 /t due to growth in its industrial use.

However, prices dropped to $1 936.10 / t in December of the same year as result of lower demand drive from China, (Figure 37). Prices recovered in 2015, in anticipation of a market deficit resulting from the closure of two lead and zinc mines later in the year, before dropping again in June as a result of falling e-bike sales.

FIGURE 37: LEAD CASH SETTLEMENT PRICES (MONTHLY AVERAGE) IN 2013 - 2015



Source: DMR, Directorate Mineral Economics
London Metal Exchange (LME)

South Africa recorded a 13.2 percent decrease in export sales volumes to 33 kt compared with 2013. Revenues generated from lead sales decreased by 3.4 percent to R660 million in 2014 compared with R683 million recorded in 2013, (Table 47). Despite the increase in unit values by 9.4 percent from R18 066 in 2013 to R19 765 recorded in 2014, the sustained lower production levels and subsequent export sales volumes resulted in lower revenues generated.

EMPLOYMENT

Total employment in South Africa's lead mines decreased marginally by 0.9 percent to 1 424 in 2014 compared with 1 437 employees in 2013 (Table 48). Total earnings increased by 6.6 percent to R219 million compared with R205 million recorded in 2013. Per capita earnings increased by 7.6 percent in 2014 indicating an improvement of salary levels. The employment of female employees improved by 4.6 percent to 205 compared with 196 employees in 2013. Lower mine production levels resulted in a 34.5 percent drop in employee's productivity to 19 t/ employee compared with 29 t/ employee in 2013.

TABLE 48: EMPLOYMENT AND REMUNERATION IN SOUTH AFRICA'S LEAD MINES IN 2014

YEAR	EMPLOYEE	REMUNERATION	
	Number	R'000	Average Earnings R
2010	1 893	156 456	82 650
2011	1 312	167 552	127 707
2012	1 323	184 164	139 212
2013	1 437	205 403	142 939
2014	1 424	219 004	153 795

Sources: DMR, Directorate Mineral Economics

KEY DEVELOPMENTS

Metals of Africa Limited, an Australian based exploration company registered on the Australian Securities Exchange (ASE), is undertaking explorations in the Kroussou project located in the Province of Ngounie, south east of the Gabon capital of Libreville. In October 2014, the company announced a discovery of higher grades of lead and zinc from its ongoing exploration programme at Kroussou project. The results

from laboratory assay from a rock chip samples included the highest grades, 33.1 percent lead and 9.7 percent zinc, ever reported in Gabon. Metals of Africa Limited have completed the mapping programme which has targeted the identification of the Cretaceous Cottier basin sediments and Archean-Paleoproterozoic basement rocks. The rock chip samples to further confirm the grades and mineralogy of the outcropping mineralisation are currently being dispatched to the Société Generale de Surveillance (SGS) laboratory in South Africa for geochemical analysis. Drilling programme was planned to commence during the last quarter of 2015 pending the outcome of all exploration data.

In the past 20 years, the centre for international lead market has shifted to China which has become not only the largest producer of the primary and secondary lead but also the largest consumer of the metal. China uses lead-acid batteries in vehicles and e-bikes for lighting and starting as well as in solar installations and telecommunication systems to store energy. The method used for the lead recovery from lead-acid battery recycling has been inefficient, resulting in the release of millions of tons of lead into the environment, where it has the possibility to be absorbed by human and animals through inhalation of dust or ingestion through contaminated food and water. The implementation of environmental regulation which was adopted in April 2014 resulted in the closure of several secondary lead refinery plants by the environmental regulators because of non-compliance.

OUTLOOK

Global lead mine production is forecast to decrease by 2.5 percent to 4.80 Mt in 2015, according to ILZSG. This is primarily as a result of a 13 percent decrease in Australia's output resulting from a suspension of production at Ivernia's Paroo Station operation and a cut in production by South 32's Cannington operation due to the LME lead prices which have dropped below sustainable levels. A further decrease is expected from the closure of Century and Lisheen mines later this year in Australia and Ireland respectively, as well as announcement by Glencore to cut production of up to 100 kt per annum due to adverse lead prices.
World refined lead production is forecast to be in deficit by 70 kt in 2015 extending to 2016. This is as a result of the several shutdowns of the China's secondary refining sector by environmental inspections and the shutdown of Exide Technologies secondary plant in Vernon, California in March 2014. Lead metal production is expected to recover in 2017 due to increased output from China as the country's secondary sector is expected to be upgraded to comply with environmental regulations. Additional output is expected from Republic of Korea where Korea Zinc is expected to complete work on the construction of a new 130 kt per year capacity lead plant in Ulsan. Global refined lead consumption is anticipated to fall by 4.5 percent to 10.82 Mt in 2015, driven by the slowdown in China's production and sales of e-bikes which accounts for more than 30 percent of lead metal usage in China. The slow growth in e-bike sales is expected to have a negative impact on the overall demand from China.

LME lead prices are expected to fall in 2015, as a result of poor demand from major consumers and the expansion of transport system in China which has a negative impact on e-bike usage. Thus, LME lead prices are expected to fall to an annual average bellow $1 800 /t in 2015. LME stock levels have been gradually increasing putting a downward pressure on already struggling prices.

South Africa's lead mine production is expected to remain at lower levels as a result of lower ore grade. Poor global market conditions are not conducive for the development of new projects.

REFERENCES

1. *Creamer Media: Base Metals Report, October 2015*
2. *International Lead and Zinc Study Group, Review of Trends, February 2015.*
3. *International Lead and Zinc Study Group Session/Forecast, October 2015*
4. *http://www.fastmarkets.com/base-metals/lead-analysis-forecast-q4-2014*
5. *htt://www.metalbulletin.com*
6. *Mining Weekly, 30 July 2015*
7. *U.S. Geological Survey, Mineral Commodity Summaries, January 2015*
8. *DMR, Mineral Economics Directorate*

NICKEL

L Ramane

SUPPLY AND DEMAND

World nickel reserves were estimated at 81 Mt in 2014, Australia had the largest reserves accounting for 23 percent of the world total, followed by New Caledonia and Brazil at 15 and 11 percent, respectively. South Africa accounted for 5 percent of world reserves and was ranked 7th (Table 49).

World nickel mine production fell by 9.6 percent to 2.40 Mt in 2014, compared with 2.63 Mt in 2013; this is due to Indonesia cutting its production by more than 50 percent. Indonesia banned the export of unprocessed nickel, encouraging the construction of additional ferronickel and nickel pig iron production facilities. This created a shift in market dominance with the Philippines taking over as the largest producer in the world, accounting for 18 percent. It was followed by Russia's 11 percent and Indonesia's 10 percent. At 2 percent, South Africa was ranked 11th.

TABLE 49: WORLD NICKEL RESERVES AND MINE PRODUCTION, 2014

COUNTRY	RESERVE			MINE PRODUCTION		
	kt	Percent	Rank	kt	Percent	Rank
Australia	19 000	23	1	220	9	5
Brazil	9 100	11	3	126	5	7
Canada	2 900	4	10	233	9	4
China	3 000	4	9	100	4	8
Colombia	1 100	1	12	75	3	9
Cuba	5 500	7	5	66	3	10
Indonesia	4 500	6	6	240	10	3
Madagascar	1 600	2	11	37	1	12
New Caledonia	12 000	15	2	165	7	6
Philippines	3 100	4	8	440	18	1
Russia	7 900	10	4	260	11	2
South Africa	3 700	5	7	55.0	2	11
Other	7 600	9		383	19	
TOTAL	81 000	100		2 400	100	

Source; USGS, Mineral Commodity Summaries, Nickel
**DMR, Mineral Economics Directorate*

In South Africa, nickel production rose by 7.4 percent to 55 kt in 2014, compared with 51.2 kt in 2013, due to the increase in production at Nkomati mine, as well as production increases at Mogalakwena platinum mine and Anglo platinum's offshore refining (Table 50). Local sales volumes declined by 9 percent to 8.1 kt, compared with 8.93 kt in 2013, as a result of weak demand from the local steel industry.

TABLE 50: SOUTH AFRICA'S PRODUCTION AND SALES OF NICKEL, 2004 – 2014

YEAR	PRODUCTION	LOCAL SALES			EXPORT SALES		
	Mass	Mass	Value	Unit Value	Mass	Value	Unit value
	kt	kt	R'000	R/t	Kt	R'000	R/t
2004	39.9	25.0	2 139 682	85 587	17.8	1 513 381	85 021
2005	42.4	20.3	1 909 468	94 062	22.2	2 013 553	90 701
2006	41.8	25.6	4 154 730	162 294	18.2	2 620 855	144 003
2007	37.9	15.5	3 724 689	240 303	21.4	5 599 739	261 670
2008	31.7	6.7	1 151 894	171 924	23.5	4 103 711	174 626
2009	34.6	9.0	949 855	105 539	27.3	3 251 353	119 097
2010	40.0	7. 3	1 073 290	147 168	33.1	4 911 462	148 522
2011	43.3	14.5	2 326 440	160 924	26.6	4 075 750	152 962
2012	45.9	11.3	1 539 962	136 182	35.5	4 892 384	137 786
2013	51.2	8.9	1 216 372	136 303	40.5	5 743 349	141 741
2014	55.0	8.1	1 429 476	176 435	48.1	7 705 911	160 139

Source: DMR, Mineral Economics Directorate

In 2014, global refined nickel production increased by 7.3 percent to 1.902 Mt compared with 1.771 Mt (Table 51). China, at 36 percent, was the world's largest producer of refined nickel, followed by Russia's 13 percent and Japan's 9 percent.

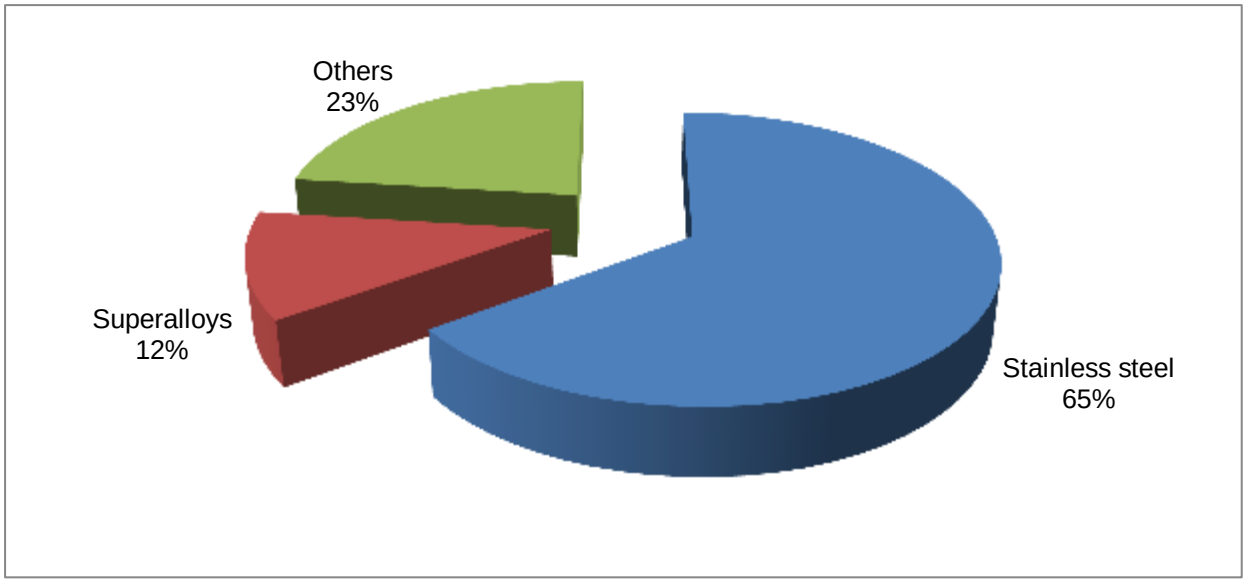
TABLE 51: WORLD REFINED NICKEL PRODUCTION, 2014

COUNTRY	**REFINED PRODUCTION**			
	2013 (kt)	**2014 (kt)**	**Percentage**	**Rank**
China	711	680	36	1
Russia	246	246	13	2
Japan	178	175	9	3
Canada	137	119	6	5
Australia	142	137	7	4
EU	118	106	6	6
Norway	91	91	5	7
Others	365	356	19	-
WORLD TOTAL	1,988	1,910		

Source: The Economist group

According to the International Nickel Study Group (INSG), global consumption of nickel increased by 7.8 percent to 1 930 kt in 2014, from 1 790 kt in 2013. Despite China's weakening demand for Nickel Pig Iron (NPI), the country still consumed about 40 percent of global primary nickel. The lack of NPI demand is as a result of the continued slowing of the Chinese economy, and the European Union's anti-dumping duties imposed on imports of stainless steel produced in China. The stainless steel industry is the largest consumer of nickel, accounting for 65 percent of the global metal consumption (Figure 38), followed by the manufacture of super alloys at 12 percent and the balance is consumed in alloy steels, rechargeable batteries, catalysts, coins and foundry products.

FIGURE 38: THE PRIMARY END-USES FOR NICKEL 2014

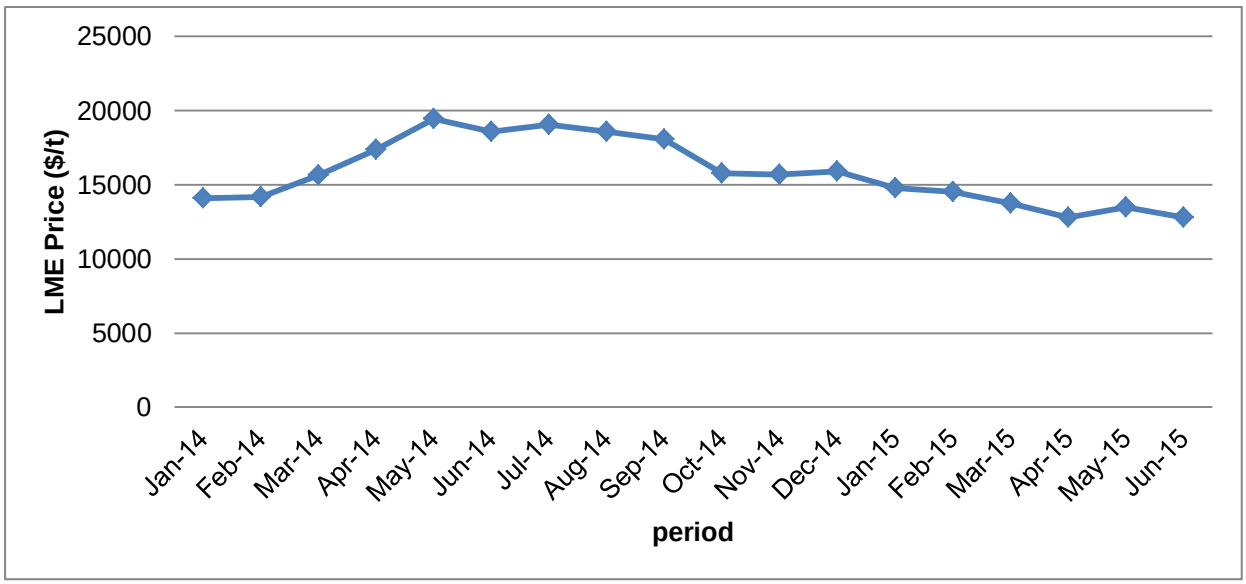


Source: Basemetals. Com, 2014

PRICES

In 2014 the nickel price started recovering from a five year price drop, with the LME cash settlement price significantly increasing from $14 076/t in January 2014 to an all-time high of $19 434/t in May 2014, resulting from the anticipated ban on export of unprocessed ores in Indonesia. The high nickel price prompted nickel producers to take advantage and bring in new nickel projects online. However, in June 2014, the price fell slightly to $18 568/t and continued on that downward trend reaching $15 914/t in December of that same year. In June 2015, nickel prices had fallen to lows of $12 776/t, from $14 776/t in January, when the supply-demand balance tightness did not happen due to the Indonesian restriction on the export of unrefined nickel ores. (Figure 39).

FIGURE 39: MONTHLY AVERAGE NICKEL PRICES, 2014- 2015



Source: Metal Bulletin

In 2014, South Africa's local and export unit sales values also increased by 29.4 and 13 percent to R176 435/t and R160 139, respectively, consistent with the high LME nickel cash settlement price. Local

sales revenue increased by 18 percent to R1.43 billion, despite the lower sale volumes. Furthermore, both export volumes and revenue increased 19 and 34 percent to 48.1 kt and R7.71 billion, respectively (Table 50).

EMPLOYMENT

South Africa's nickel industry employment fell by 1.8 percent to 3 092, compared with 3 149 people in 2013, due to Nkomati mine shedding temporary jobs (contractors) as a result of the completion of the expansions at mine. However, total remuneration increased by 6.7 percent to R6.09 billion, compared to R5.71 billion in 2013, as a result of annual salary increases and performance bonuses. Per capita earnings also rose by 8.7 percent in the same period (Table 52).

TABLE 52: EMPLOYMENT IN THE PRIMARY NICKEL SECTOR, 20112-2014

YEAR	TOTAL EMPLOYEES	TOTAL REMUNERATION (R)	PER CAPITA PAYMENTS
2012	3 051	538 039 800	176 349
2013	3 149	571 601 731	181 518
2014	3 092	609 828 343	197 228

Source: DMR, Mineral Economics Directorate

KEY DEVELOPMENTS

Chinese investors have invested funds to build numerous nickel smelters in Indonesia, after its government announced a ban on exports of unprocessed nickel in January 2014. The Indonesian government imposed these sanctions to promote local beneficiation on nickel. As a result this move is removing a significant amount of nickel ore from the market and this particularly impacts on China, which imports a large quantity of ore from Indonesia for processing into NPI, hence the Chinese's investment in that country.

The Ambatovy nickel/cobalt mine located in Madagascar, started production in January 2014, with an output of 37 053 t. this project is a joint venture (JV) involving Canada's Sherritt International (40 percent), Japan's Sumitomo (27.5 percent), Korea Resources (27.5 percent) and SNC-Lavalin (5 percent). This project is anticipated to produce up to 60 000 t/y of nickel and 5 600t/y of cobalt at full capacity and has a life of mine of about 30 years.

The Enterprise project in Zambia is owned by Canadian company First Quantum Minerals will produce 38 000 t/y initially, with potential to increase to 60 000 t/y when market conditions improve. The project has been granted environmental approval and site construction work is under way.

In Tanzania, Australian listed IMX Resources and Fig Tree Resources Fund II are developing the Ntaka Hill nickel project, which has the potential to be developed as a high grade open pit and underground operation. Mine production is expected to be between 9 000 t/y and 10 500 t/y of nickel in concentrate for ten years. $227 million was invested in the pre-production phase of this project, and the estimated life of mine is 15 years. Table 53 depicts other developments in the nickel mining industry in other parts of the world.

TABLE 53: GLOBAL NICKEL MAJOR PROJECTS

Project	Country/Region	Operators/Owners	Potential start year	Nickel production (kt/a)	*Project Cost
Koniambo Laterite Nickel Mine	New Caledonia	Xstrata Plc	2014	60	$51 billion
Mindoro Laterite Nickel Project	Philippines	Intex Resources ASA	NA	53	$2.45 billion
Long Harbour Hydrometallurgy Nickel Smelter	Canada	Vale S.A	2014	50	$3.5 billion
Minago Nickel Project	Canada	Victory Nickel Inc.	2014	11	$523 million
Honeymoon Well Nickel Project	Australia	OJSC MMC Norilsk Nickel	2017	40	$1.5 billion
Feni Haltim Nickel Project	Indonesia	PT Antam Tbk	2015	27	$1.6 billion
Acoje Laterite Nickel Mine	Philippines	DMCI Holdings Inc	2014	24.5	$33.6 million
Aquila Nickel Project	Indonesia	Solway Group	2014	38	n/a
Fenix Laterite Nickel Operation	Guatemala	Solway Group	2014	24.3	$170 million
Agata Laterite Nickel Project	Philippines	TVI Pacific Inc	NA	17.2	$308 million
Decar Nickel Project	Canada	Cliffs Natural Resources Inc	NA	37.4	C$1,384 million
Dumont Nickel Project	Canada	Royal Nickel Corporation	2016	47	$1.6 billion
Kalgoorlie Laterite Nickel Project	Australia	Heron Resources Limited	n/a	23	A$356 million
Marlborough Laterite Nickel Project	Australia	Gladstone Pacific Nickel Ltd	2015	63	$3.5 billion
Mayaniquel Laterite Nickel Mine	Guatemala	Anfield Nickel Corp		36.5	$946 million
Ronnbacken Nickel/PGE Project	Sweden	IGE Resources AB	2015	26	$1.2 billion
Turnagain Nickel Project	Canada	Hard Creek Nickel Corporation	2016	39.5	$1.3 billion
Wingellina Laterite Nickel Deposit	Australia	Metals X Limited	NA	40	$2.3 billion

Source: KPMG, 2014

- *Various sources*

OUTLOOK

The International Nickel Study Group (INSG) expects that the global nickel market will move into a deficit in 2016 from a small surplus in 2015. They estimate that output will shrink to 1.94 Mt in 2016, while demand is expected to increase to 1.97 Mt. The Indonesian ban on ore exports is already affecting the production of the Chinese NPI production and ferronickel output in Japan and elsewhere, removing 300 kt of nickel from the market. However, increasing supply from new projects will likely offset the supply loss.

The growing demand for nickel by stainless steel producers is likely to continue in the short to long term, which will drive the buoyant global nickel market. Global refined nickel consumption is continuously increasing as it is used in more` industrialized products. Various industries that have high application of refined nickel, such as the developed automotive and aerospace industries are pushing demand for the metal. It is therefore anticipated that the global refined nickel consumption will grow at around 6 percent in 2016, according to Global Nickel Market Outlook 2016 Report.

The nickel price should be gaining momentum, with production cuts taking place and Indonesian ore stocks being low, but with the high LME stocks, prices may need more time to show an improvement. The nickel price is forecast to average at $13 000\t in 2016. In South Africa, the production of nickel is expected to rise in-line with production increases in the platinum sector as well as improved recoveries from the country's sole nickel producer, Nkomati Nickel Mine. No supply interruptions are anticipated in 2016, despite labour unions negotiating for a new wage agreement, with the current one expiring in June 2016.

REFERENCES

1. *Creamer Media's Research Channel, A Review Of Africa's Base Metal Sector December 2015*
2. *DMR, Directorate Mineral Economics*
3. *file:///C:/Users/sharon.ramane/Downloads/Gladstone%20Nickel%20Project%20(GNP).pdf*
4. *http://imxresources.com.au/projects/ntaka-hill-nickel-project/*
5. *http://nickelmountain.se/assets-operations/ronnbacken/*
6. *http://www.anfieldnickel.com/s/Mayaniquel.asp?ReportID=591208*
7. *http://www.asx.com.au/asxpdf/20140408/pdf/42nw5wdq1sk6qb.pdf*
8. *http://www.fastmarkets.com/base-metals/nickel-price*
9. *http://www.firstpointminerals.com/s/Decar_BC.asp*
10. *http://www.metalsx.com.au/system/announcements/508/20130419_MLX_Appoints_SNC_for_Wing_DFS.pdf*
11. *http://www.mindoro.com/s/Agata_Dev_Options.asp*
12. *http://www.prnewswire.com/news-releases/global-nickel-market-outlook-2016-300077942.html*
13. *KPMG Quarterly Bulletin*
14. *Metal Bulletin*
15. *The Economist Group, http://store.eiu.com/*
16. *USGS, Mineral Commodity Summaries, January 2015*

TITANIUM

N Mahala

SUPPLY AND DEMAND

World reserves of titanium minerals increased by 2.5 percent to 768.9 Mt in 2014 compared with the previous year (Table 54). The improved reserves are acknowledged to the recently confirmed feasibility studies on major exploration projects and mine expansions around the world, in particular in Africa and Australia. Global mine production was estimated to have improved by 16.8 percent to 9 091 Mt year on year in 2014. South Africa was by far the world's biggest producer of titanium minerals, with an output of 2 511 Mt (27.6 percent) in 2014. This was closely tailed by Australia, with output of 1 887 Mt (20.7 percent).

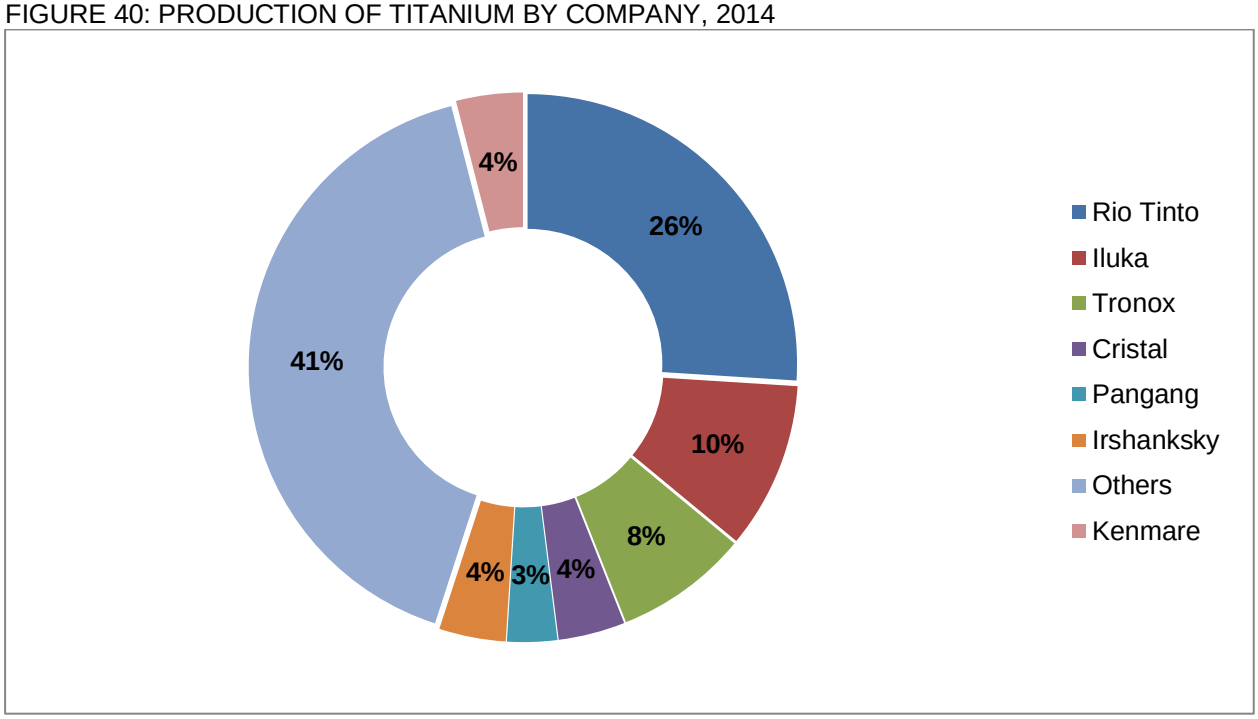
TABLE 54: WORLD RESERVES AND PRODUCTION OF TITANIUM CONCENTRATE, 2014

	RESERVES			PRODUCTION*		
COUNTRY	Mt	%	Rank	kt	%	Rank
Australia	198.0	24.6	2	1 887	20.75	2
Brazil	43.0	5.9	5	70	0.76	13
Canada	31.0	4.1	8	900	9.89	4
China	200.0	26.7	1	1 000	11.00	3
India	92.4	12.3	3	366	4.025	10
Madagascar	41.0	5.3	6	347	3.81	8
Mozambique	14.0	1.9	9	500	5.49	6
Norway	37.0	4.9	7	400	4.39	9
Sierra Leone	3.8	0.5	11	120	1.31	12
South Africa*	73.3	9.5	4	2 511	27.62	1
Sri Lanka	NA	NA	NA	32	0.35	14
Ukraine	8.4	1.1	10	260	2.86	7
USA	2.0	0.3	12	100	1.09	11
Vietnam	1.6	0.2	13	500	5.50	5
Other	23.4	3.5	-	98	1.07	-
TOTAL2014**	**768.9**	**100.0**		**9 091**	**100.0**	
2013	**750.0**			**7 560**		

Sources: USGS, Mineral Commodity Summaries, January 2015,
** DMR, Mineral Economics*

Rio Tinto was the largest producer of titanium minerals from its operations in South Africa, Canada and USA. Iluka was the second largest producer with operation in Australia and USA. Rio Tinto and Iluka accounted for over 65 percent of global production (Figure 40).

FIGURE 40: PRODUCTION OF TITANIUM BY COMPANY, 2014



Source: Iluka, Mineral Sands Industry: Fact Book, 2014

South Africa's titanium concentrates production decreased by 3.5 percent to 2 511 kt in 2014 compared with 2013 (Table 55). Some mining companies reduced their production in response to the weaker prices. Local and export sales volume increased by 2.8 percent and 23 percent to 2 757 kt and 123 kt respectively.

TABLE 55: SOUTH AFRICA'S TITANIUM PRODUCTION AND SALES, 2005 – 2014

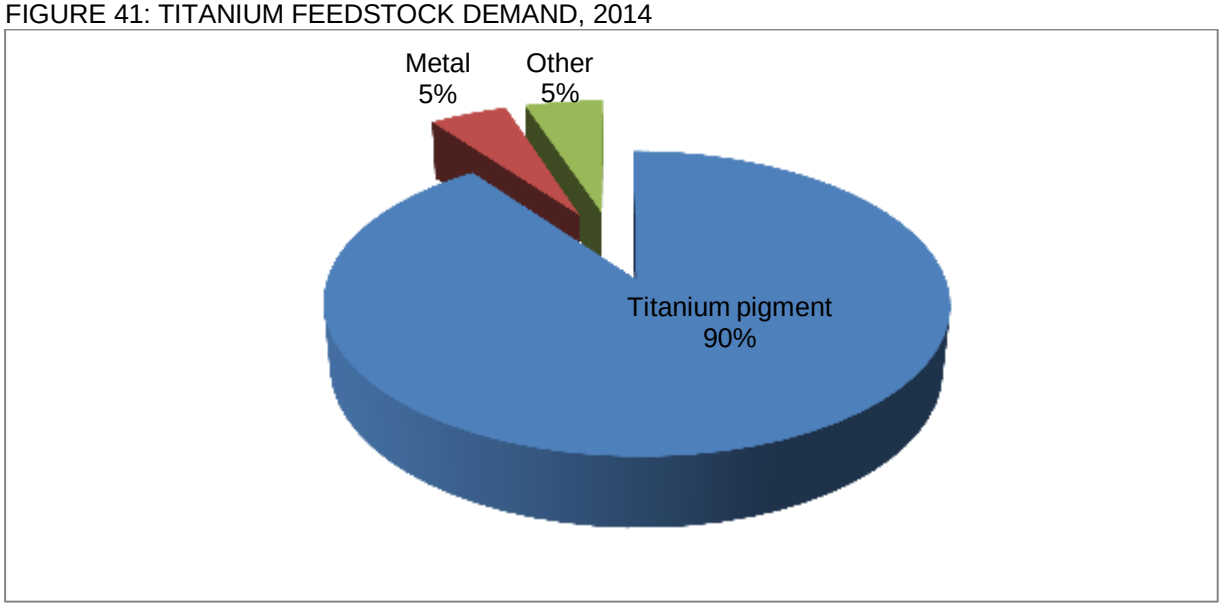
	PRODUCTION	LOCAL SALES			EXPORT SALES		
YEAR	Mass	Mass	Value (FOR)		Mass	Value (FOB)	
	kt	kt	RM	R/t	kt	RM	R/t
2005	2 682	1 759	284	162	254	610	2 405
2006	2 463	1 985	352	177	253	696	2 747
2007	2 605	2 021	394	195	220	604	2 748
2008	2 439	2 087	427	205	165	563	3 417
2009	2 507	1 621	414	256	105	494	4 694
2010	2 339	2 009	434	216	136	581	4 262
2011	2 896	2 355	562	239	136	658	4 820
2012	2 801	2 621	2 315	883	95	1 451	15 190
2013	2 604	2 682	2 712	1 011	100	1 028	10 256
2014	2 511	2 757	2 934	1 064	123	1 025	8 329

Source: DMR, Mineral Economics

Global pigment demand increased by an estimated 4 percent in 2014 to 5.55 Mt but did not translate into any significant earnings improvement for either the pigment or the feedstock producers as pigment prices weakened due to strong competition from robust Chinese pigment production base. Titanium market remained under pressure for the entire 2014, with poor grade concentrates being affected the most.

About 90 percent of the titanium feedstock was used in production of titanium dioxide pigment, with the remainder used in metal production and other uses (Figure 41). According to TZ Minerals International Pty Ltd (TZMI), titanium pigment segment has been performing at an average annual growth rate of about 4 percent that is in line with global GDP growth for the last 10 years. Metal production and other uses showed strong growth over the same period at around 12 percent per annum. Critical sectors in metal production were aeronautics, defence applications, biomedical and sporting goods.

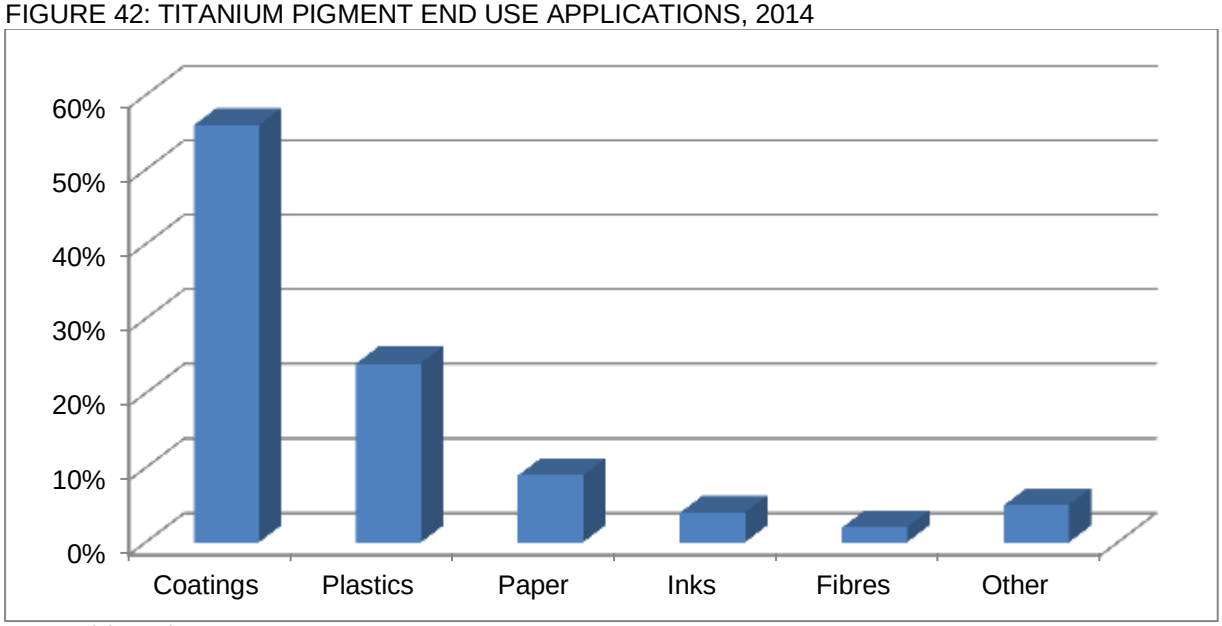
FIGURE 41: TITANIUM FEEDSTOCK DEMAND, 2014



Source: TZMI Estimate, 2014

In terms of titanium pigment applications, about 56 percent percent was used in the coatings sector with growth drivers being construction activity, air traffic and travel, international trade, discretionary spending and car sales. Plastics were a significant consumer of TiO2 pigment, taking a share of 24 percent. The remainder went to paper, inks, and fibres (Figure 42).

FIGURE 42: TITANIUM PIGMENT END USE APPLICATIONS, 2014

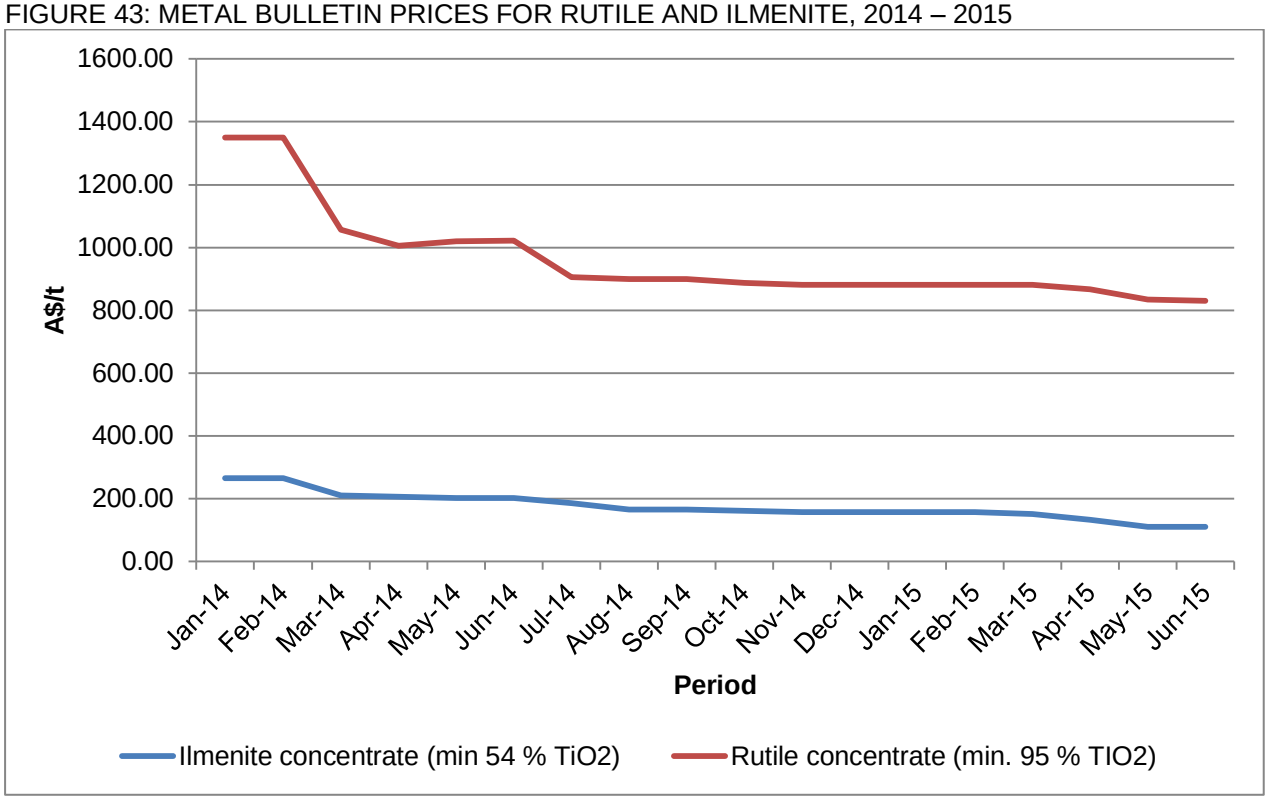


Source: Iluka Estimates, 2014

PRICES

The titanium market was in surplus due to weaker demand resulting from China flooding the market with its feedstock derived from iron ore mining as by-product. According to Metal Bulletin, rutile prices in the first quarter of 2014 were recorded at an average of A$ 1 252/t and massively decreased by 29.7 percent to an average of A$ 880/t in the last quarter of 2014. Ilmenite followed the same trend as rutile, price decreasing from an average of A$ 155/t in the last quarter of 2014 from A$ 246/t at the beginning of the year (Figure 43). Overall, rutile and ilmenite prices decreased both by an average of 46 percent to A$ 880/t and A$ 155/t compared to 2013. Prices remained weak in the first half of 2015 with similar figures as the last half of 2014.

FIGURE 43: METAL BULLETIN PRICES FOR RUTILE AND ILMENITE, 2014 – 2015



Source: Metal Bulletin, 2014-2015

South African revenues generated from local sales of titanium minerals increased by 8 percent to R 2 934 billion due to a 5.2 percent increase in unit values while export related revenues declined by 0.3 percent to R1 025 billion due to 18 percent decline in unit values (Table 55).

EMPLOYMENT

In 2014, employment in the titanium sector improved by a slight 3.8 percent to 6 576 employees compared with 2013 (Table 56), attributed to new mines and expansions that came on online during that period. A reasonable number of employees were also retrenched during the reporting period but the shortfall was offset by new mines such Tormin Mineral Sands in the Western Cape. Although the number of employees increased, total remuneration decreased by 2.2 percent to R 1.3 billion and per capita earning decreased by 5.9 percent to R 204 thousand. These lower earnings are largely influenced by sharp decrease in performance production bonuses. Productivity of employees decreased by 7.9 percent to 381t per employee in 2014 compared with 2013. This drop is largely influence by external factors such as subdued global demand for titanium minerals during the reporting period.

TABLE 56: EMPLOYMENT AND REMUNERATION IN THE TITANIUM SECTOR IN 2014

YEAR	EMPLOYEE	REMUNERATION	
	Number	R'000	Per Capita Earnings
2009	6825	1 373 855	201
2010	7154	1 578 092	221
2011	6324	1 805 121	285
2012	6503	2 092 252	322
2013	6 335	1 373 440	217
2014	6 576	1 342 184	204

Source: DMR, Mineral Economics

KEY DEVELOPMENTS IN AFRICA

In Africa, four heavy mineral concentrate mines began production in 2014. These mines are profiled in detail under zircon chapter of this publication. Table 57 below gives a synopsis of these new mines.

TABLE 57: SUMMARY OF DEVELOPMENTAL PROJECTS/MINES IN AFRICA, 2014

Project/Mine Name	Owner	Commodity	Production	Employment	Life of mine
Tormin Mine	Mineral Commodities Limited	Zircon, rutile, ilmenite, garnet	47 kt/y	215	25
Kwale Mine	Base Resources limited	Ilmenite, rutile, zircon	470 000 kt/y	Over 800	13
Grand Cote	Tizir Limited	zircon, rutile and leucoxene, and ilmenite	815 kt/y	800	25
Fairbreeze Mine	Tronox Limited	Ilmenite, rutile, zircon	250 kt/y	1000 expected	15

Source: Various company annual reports, 2014

OUTLOOK

Chinese ilmenite is typically of lower grade and produced primarily as a by-product of iron ore mining and has been the main cause of the oversupply in the titanium market. However, the Chinese supply is expected to drop due to its exposure to iron ore mining which is hard hit by low prices. Iron ore producers in China have been forced to cut back on production which will directly impact on the supply of ilmenite. As a result, the titanium market will rebalance itself and demand is likely to improve. According to TZMI, although softer market conditions have persisted into the first quarter of 2015, positive macroeconomic trends indicate that the titanium demand should improve over the course of 2016. Oversupply of titanium feedstock will remain an issue for the rest of 2015 with ilmenite being the most affected sector.

Metal Bulletin forecasts that titanium prices will remain under pressure in the short term due to present surplus market conditions. However, in the developed economies titanium demand is expected to increase as GDP in those regions is expected to increase. In the long term, overall prices are expected to increase by 20 percent. South Africa's production and sales volumes of titanium minerals are expected to increase by 6 percent to 2 661 kt and 2 946 kt respectively in 2016. This increase is expected to come from new Fairbreeze Mine which is expected to come online in December 2015.

REFERENCES

1. *USGS, Mineral Commodity Summaries, January 2015*
2. *Tronox Limited 2014, Annual Report and corporate Responsibility report*
3. *Metal Bulletin*
4. *Kenmare Resources plc, Annual Report 2014*
5. *Department of Mineral Resources, Mineral Economics Directorate, various publications and statistics*
6. *Mineral Sands Resources PTY LTD, Tormin Mine Presentation, 7th May 2015*

ZINC

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SUPPLY AND DEMAND

In 2014, world zinc reserves were estimated at 230 Mt according to United States Geological Survey (USGS). Australia hosted the world's largest zinc reserves, accounting for 27 percent of global total, followed by China (18.7 percent) and Peru (12.6 percent). South Africa, with 6.5 percent of the world zinc reserves was ranked 5th (Table 58).

World zinc mine production increased by 1.4 percent to 13.4 Mt in 2014 compared with 13.37 Mt in 2013. This was driven by a 6.3 percent rise in production from China, which offset reductions in Australia, Canada, Namibia and Peru. Africa collectively accounted for 2.3 percent (313 kt) of the world total. Namibia, at 180 kt, had the continent's largest zinc mine production followed by Burkina Faso's 55 kt, Morocco's 35 kt and South Africa's 26 kt.

TABLE 58: WORLD RESERVES AND MINE PRODUCTION OF ZINC, 2014

COUNTRY	RESERVES			PRODUCTION		
	Mt	%	Rank	kt	%	Rank
Australia	62	27	1	1 485	11.1	2
Canada	5.9	2.7	9	353	2.6	8
China	43	18.7	2	5 028	37.6	1
India	11	4.8	6	706	5.3	5
Ireland	1.1	0.5	10	290	2.2	9
Kazakhstan	10	4.3	7	386	2.9	7
Mexico	16	7	4	677	5.1	6
Namibia	X	-	-	180	1.3	10
Peru	29	12.6	3	1 319	9.9	3
South Africa	15	6.5	5	26	0.2	27
USA	10	4.3	7	821	6.1	4
Other	27	11.7	-	2 101	15.7	-
Total	**230**	**100**		**13 372**	**100**	

Sources: *ILZSG, Session/Forecast April 2015*
USGS, January 2015
DMR, Directorate Mineral Economics

South Africa's zinc mine production decreased by 13.3 percent to 26 kt in 2014 compared to 30 kt recorded in 2013 (Table 59). This was due to lower head grade as well as higher production costs resulting from the volatile zinc price. Export sales increased by 7.7 percent to 28 kt compared with export sales recorded in 2013. All the zinc produced in the country is sold on the export market.

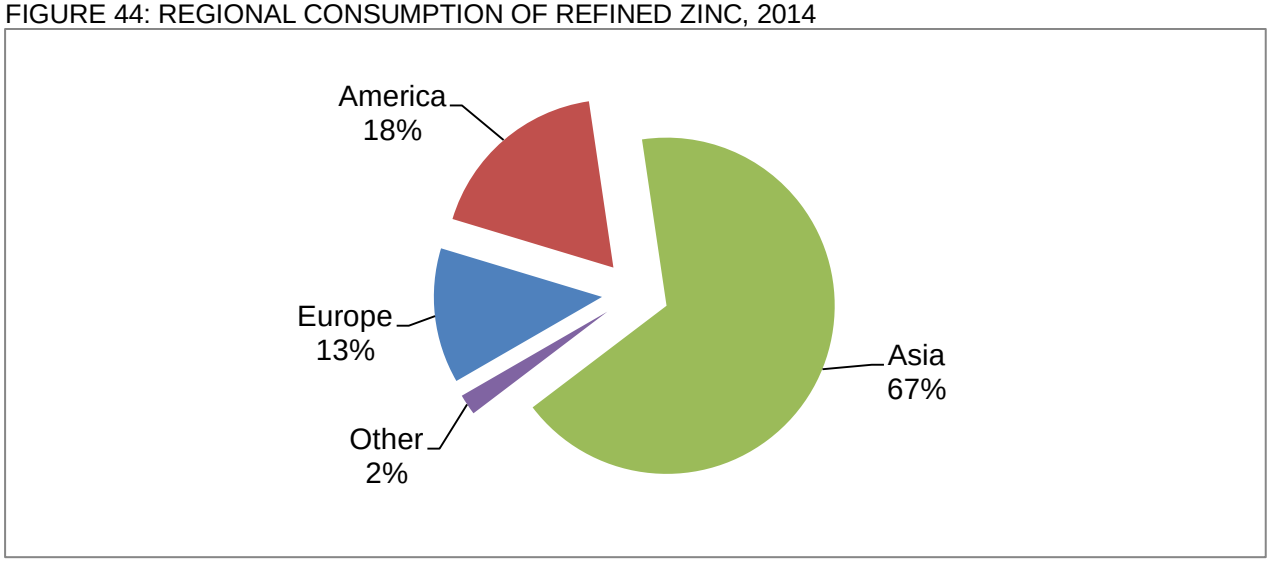
TABLE 59: SOUTH AFRICA'S PRODUCTION AND SALE OF ZINC METAL IN CONCETRATE 2004-2014

YEAR	PRODUCTION	LOCAL SALES			EXPORT SALES		
	Mass	Mass	Value (FOR)		Mass	Value (FOB)	
	kt	kt	R'000	R/t	kt	R'000	R/t
2004	32	31	107 630	3 415	-	-	-
2005	32	31	144 752	4 640	-	-	-
2006	34	33	133 500	4 444	-	-	-
2007	31	30	428 959	14 114	-	-	-
2008	29	27	221 725	8 150	-	-	-
2009	28	22	170 925	7 603	-	-	-
2010	36	31	279 821	9 054	4	43 393	11 892
2011	37	17	169 416	9 917	20	233 150	11 775
2012	37	-	-	-	38	444 536	10 715
2013	30	-	-	-	26	335 687	12 487
2014	26	-	-	-	28	455 631	16 536

Sources: DMR, Directorate Mineral Economics

Global refined zinc metal output increased by 5 percent to 13.51 Mt in 2014, compared with 12.87 Mt recorded in 2013. This was due to a 14.3 percent increase in output from China, which accounts for 43.1 percent to the world total. Additional output was due to increased capacity in Europe and Kazakhstan which offset the decline from Australia, India, Peru and the United States. Africa's refined zinc production increased by 2.7 percent to 150 kt in 2014 compared with 146 kt in 2013, accounting for 1.1 percent of the global production. World zinc consumption rose by 4.3 percent to 13.52 Mt in 2014, compared with the 12.96 Mt recorded in 2013. China's usage, which accounts for 47.5 percent of total world demand, rose by 3.2 percent, primarily due to the upsurge in infrastructure projects within the automobile, housing construction, railways and power sectors across China.

FIGURE 44: REGIONAL CONSUMPTION OF REFINED ZINC, 2014



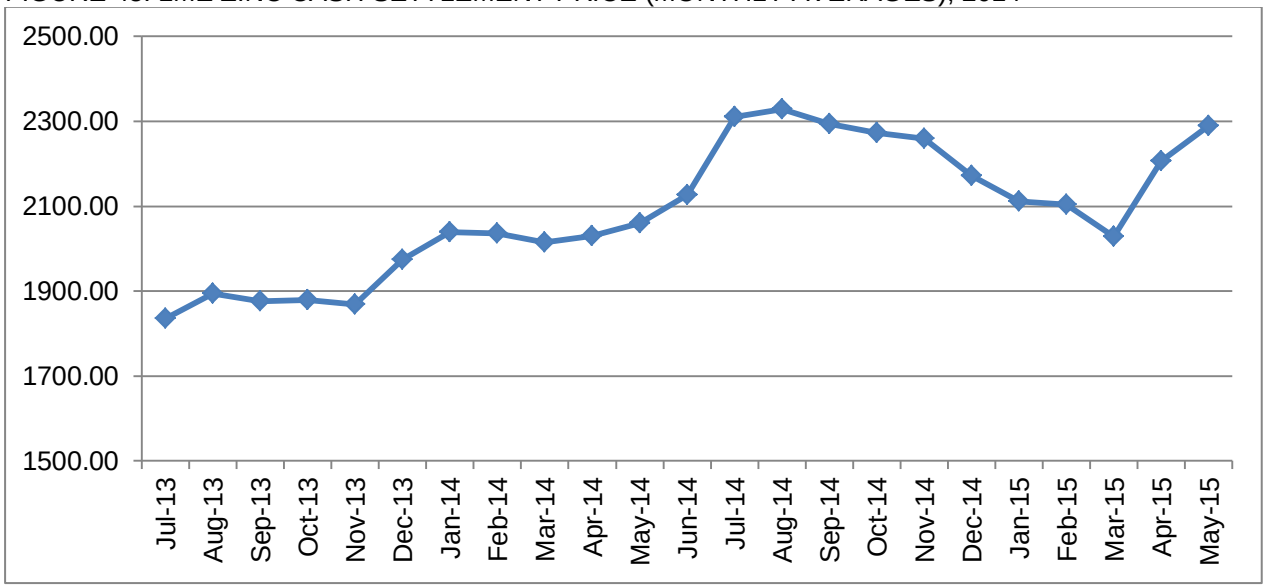
Sources: International Lead and Zinc Study Group, February 2015

Regionally, Asia continued to dominate global zinc consumption accounting for 66.6 percent followed by Europe's 17.5 percent and America's 13.4 percent (Figure 44). Africa's consumption decreased by 1.2 percent to 164 kt in 2014, accounting for 1.2 percent to global zinc usage. South Africa dominated the continent's consumption accounting for 43.9 percent to Africa's zinc usage, followed by Algeria and Nigeria at 10.4 percent each.

PRICES

London Metal Exchange (LME) zinc cash settlement prices were relatively stable throughout 2014. LME zinc prices averaged $2 162 /t, 13.1 percent higher compared with 2013. The lowest average zinc cash settlement price was recorded in March 2014, at $2 014.40 /t while the maximum average price was recorded in August 2014, at $2 329.23 /t (Figure 45). The recorded price increase was due to the anticipated supply shortfall as a result of major mine closures and LME warehouse stock levels which were at a 4 year low amid sluggish supply growth rates. A steady improvement in the global economy and the resurgence of the US automotive industry continue to bolster the demand for the metal exerting an upward pressure on price.

FIGURE 45: LME ZINC CASH SETTLEMENT PRICE (MONTHLY AVERAGES), 2014



Sources: DMR, Directorate Mineral Economics
London Metal Exchange (LME)

In South Africa, the zinc unit price increased by 32.4 percent to R16 536 /t in 2014 compared with 2013 (Table 59), indicating a bullish global zinc market and rising price levels. Revenues generated surged 35.7 percent to R456 million in 2014 as a result of higher market prices.

EMPLOYMENT

Total employment in South Africa's zinc mines decreased by a marginal 0.9 percent to 1 424 in 2014 compared with 1 437 employees in 2013 (Table 60). Total earnings increased by 6.6 percent to R219 million compared with R205 million recorded in 2013.

TABLE 60 EMPLOYMENT AND REMUNERATION IN SOUTH AFRICA'S ZINC MINES IN 2014

YEAR	EMPLOYEE	REMUNERATION	
	Number	R'000	Average Earnings R
2010	1 893	156 456	82 650
2011	1 312	167 552	127 707
2012	1 323	184 164	139 212
2013	1 437	205 403	142 939
2014	1 424	219 004	153 795

Sources: DMR, Directorate Mineral Economics

Per capita earnings increased by 7.6 percent in 2014 indicating an improvement of salary levels. The employment of female employees improved by 4.6 percent to 205 compared with 196 employees in 2013. Lower mine production levels resulted in a 14.3 percent drop in employee's productivity to 18 t/ employee compared with 21 t/ employee in 2013.

KEY DEVELOPMENTS

The Gamsberg zinc deposit, located in Aggeneys town in the Northern Cape Province, South Africa, is one of the largest undeveloped zinc deposits in the world with estimated total resources of 186 Mt within two ore-bodies. However, a series of feasibility studies proved the project unattractive for financial returns due to unfavourable market conditions. A technical feasibility study which was completed in September 2013 proved that high levels of production can be economically achieved from an open pit operation.

In November 2014, a board of directors of Zinc International, a subsidiary of Vedanta Resources plc, approved the development of Gamsberg-Skorpion Integrated Zinc Project in South Africa and Namibia. An investment capital of $782 million was to be invested over a 3 year period, to develop open pit zinc mine in Gamsberg as well as upgrading of the Skorpion Zinc Refinery in Rosh Pinah, Namibia. The investment project plan indicated that an amount of $630 million was allocated towards development of the mine, concentrator plant and associated infrastructure at Gamsberg. The balance of the investment will be used for the conversion of the Skorpion Zinc Refinery to enable it to refine zinc sulphide concentrates from the Gamsberg Mine into special high grade zinc metal.

The Gamsberg zinc project will be developed in a phased manner, with the first phase targeting the South pit which hosts an estimated 25Mt of resources at 6.2 percent of zinc. The pit is expected to have the life of mine of approximately 13 years at a production capacity of 300 kt per annum of zinc concentrate. Pre-stripping and surface work to access the ore is currently underway with its first ore production scheduled for early 2018. The project has a potential to create about 500 permanent jobs and between 1000 – 1500 temporary jobs during the construction phase. The larger North pit has an estimated 154Mt of resources at a grade of 6.3 percent of zinc with approximately 50 year life of mine.

OUTLOOK

World zinc mine production is anticipated to increase by 3.7 percent to 13.84 Mt in 2015, following a 1.4 percent increase in 2014, according to the International Lead and Zinc Study Group (ILZSG). This is primarily due to the expected increase from the expansion of Australian's McArthur River Mining to a capacity of 125 kt per year as well as George Fisher Mine to a capacity of 64 kt per year. Additional supply growth is expected from the opening of Kyzyl-Tashtygskoe mine in Russia, with annual capacity of 90 kt, which came on stream in the second half 2014.

World refined zinc metal output is expected to increase by 5.2 percent to 13.99 Mt in 2015, mainly driven by the anticipated higher output growth of 8.9 percent from China, according to ILZSG. Additional output is expected from recent commissioning of new capacity in Brazil, India, Mexico and the Republic of Korea. World refined zinc consumption is projected to outstrip supply by 366 kt in 2015. Global zinc metal demand is expected to increase by 2.9 percent to 14.05 Mt with China's consumption anticipated to increase by 4.8 percent. The market will be driven by the China's construction and automotive industry, while the recovery of housing sector in the US and increasing automobile production will also underpin demand growth.

The main driver of the zinc market and price will be the structural issue of whether the mine supply growth will keep pace with rising consumption. The continued demand growth for zinc metal at a time when larger scale mine operation are set to close down is expected to drive price higher in 2015. Analysts expect zinc prices to reach an annual average of $2 300 /t in 2015 with approaching pinch point of concentrate supply together with sustained decline of LME stock levels is likely drive price even higher.

The development of Gamsberg project, one of the world's largest undeveloped zinc mines, expected to come on stream in 2018 is favoured by the looming market deficit. The project is expected to deliver 250 kt of zinc concentrate per annum during its first phase of production with a potential of up to 300 kt of zinc mine supply per year at later stages. This will mark South Africa as one of the top zinc producers in the world.

REFERENCES

1. *Creamer Media: Base Metals Report, December 2015*
2. *International Lead and Zinc Study Group, Monthly Bulleting Lead and Zinc Statistics, October 2014.*
3. *International Lead and Zinc Study Group, April Session/Forecast, April 2015*
4. *htt://www.metalbulletin.com*
5. *U.S. Geological Survey, Mineral Commodity Summaries, January 2015*
6. *DMR, Mineral Economics Directorate*
7. *World Bureau of Metal Statistics May 2014*

ZIRCON

N Mahala

SUPPLY AND DEMAND

Global zircon reserves in 2014 were estimated at 78 Mt, which represents an increase of 16 percent from 2013. New reserves quantification were made in various locations including, but not limited to, South Africa, Kenya, Australia, Sierra Leone and Mozambique. Australia had the biggest share of reserves at 65 percent, followed by South Africa with 18 percent and India's 4.3 percent (Table 61).

TABLE 61: WORLD RESERVES AND MINE PRODUCTION OF ZIRCON CONCENTRATES, 2014

	RESERVES			PRODUCTION		
COUNTRY	Mt	%	Rank	kt	%	Rank
Australia	51	65.6	1	900	51.0	1
China	0.5	0.6	5	140	7.9	3
India	3.4	4.3	3	40	2.3	6
Indonesia	Na	Na	Na	120	6.8	4
Mozambique	1.1	1.4	4	56	3.2	5
South Africa	14	18	2	398	23	2
USA	0.5	0.6	5	Na	Na	Na
Other	7.2	9.2	-	110	6.2	-
TOTAL* 2014	**78**	**100.0**		**1 764**	**100.0**	
2013	**67**			**1 440**		

Source: USGS, January 2015 and DMR Mineral Economics Directorate
**Totals are rounded*

In 2014, global zircon market supply increased by 23 percent to 1 764 kt compared with 1 440 kt in 2013. This increase could be attributed to the new mines that came online in Africa and Australia. In South Africa, Tormin Mine which has an estimated 4.9 Mt resources of zircon, rutile and ilmenite concentrates, commenced production of zircon and rutile concentrates in January 2014 and delivered 42 000 tonnes of non-magnetic concentrate grading 81 percent zircon and 11.6 percent rutile. Overall, South Africa's zircon production in 2014 was recorded at 398 kt which is 77 percent higher than 2013. Supply disruptions from the closure of Hillendalle mine at year end 2013 were offset by new supply from Tormin Mine which came online early in 2014. Year on year basis total sales in 2014 marginally decreased 1.3 percent to 443 kt with 3 percent of the sales sold for local market and the remainder exported (Table 62).

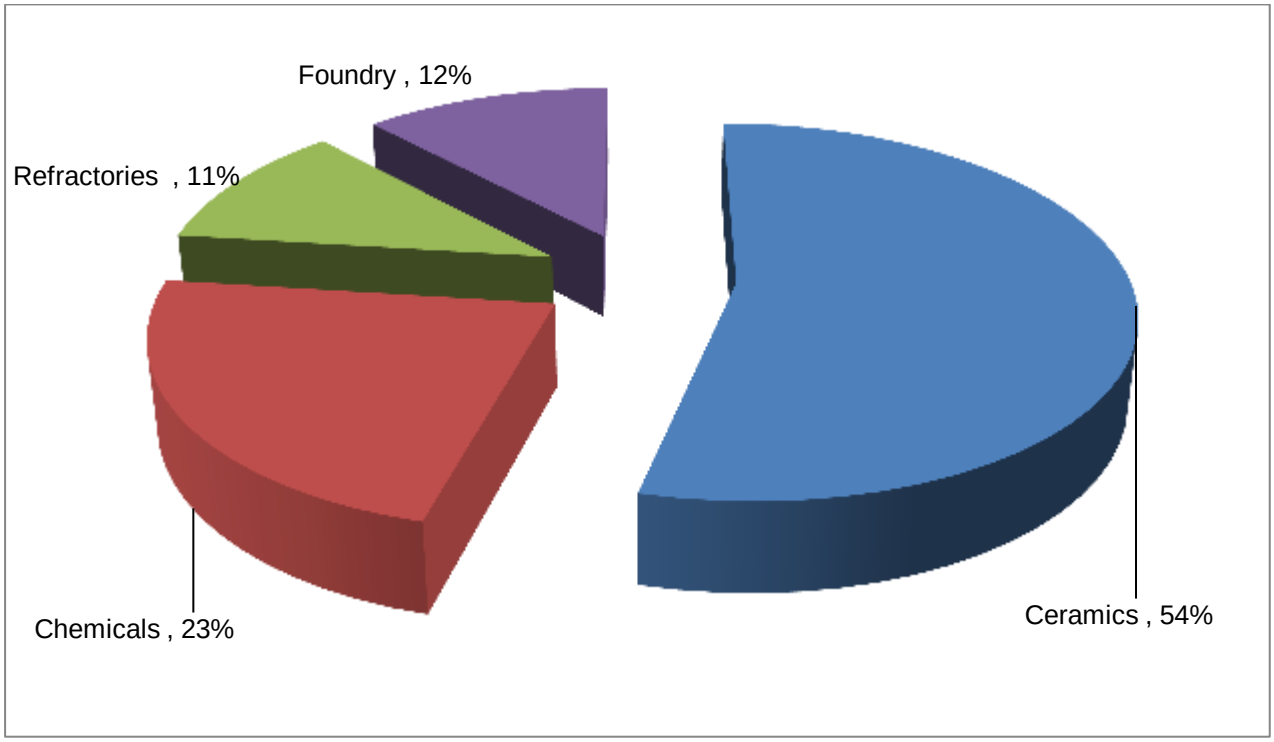
TABLE 62: SOUTH AFRICA'S ZIRCON CONCENTRATES PRODUCTION AND SALES, 2005-2014

YEAR	PRODUCTION	LOCAL SALES			EXPORTS SALES		
	Mass	Mass	Value (FOR)		Mass	Value (FOB)	
	kt	kt	R'000	R/t	kt	R'000	R/t
2005	429	19	83 325	4 287	483	2 045 876	4 237
2006	434	20	108 126	5 433	454	2 436703	5 404
2007	382	16	93 501	5 645	345	1 946 624	5 656
2008	396	18	113 576	6 102	403	2 575 873	6 378
2009	349	9	63 701	7 134	281	1 945 080	7 639
2010	389	18	111 613	6 333	684	4 348 995	6 354
2011	432	20	266 564	13 336	508	6 816 474	13 406
2012	367	7	132 761	18 928	214	4 008 161	18 760
2013	224	11	125 327	11 113	438	4 819 625	11 013
2014	398	12	138 836	11 768	431	4 601 410	10 679

Source: DMR, Mineral Economics Directorate

According to Iluka Resources estimates, zircon concentrate market was in surplus by 14 kt in 2014 due to increased supply from existing and new producers. Weaker global economic growth, in particular in China, had a negative impact on zircon market demand. Ceramics industry remained a major consumer of zircon, taking up 54 percent of global consumption (Figure 46). Typical areas of applications include porcelains melts for glazes, sanitary ware, glazed tiles, and industrial tiles. Currently, zircon is facing strong competitions from substitutes in the form of aluminosilicate minerals which can perform equally as zircon in ceramics productions. The use of substitutes is profound in the Western Europe, especially in Spain and Italy. Zircon is also consumed in the chemicals industry, foundries and refractories.

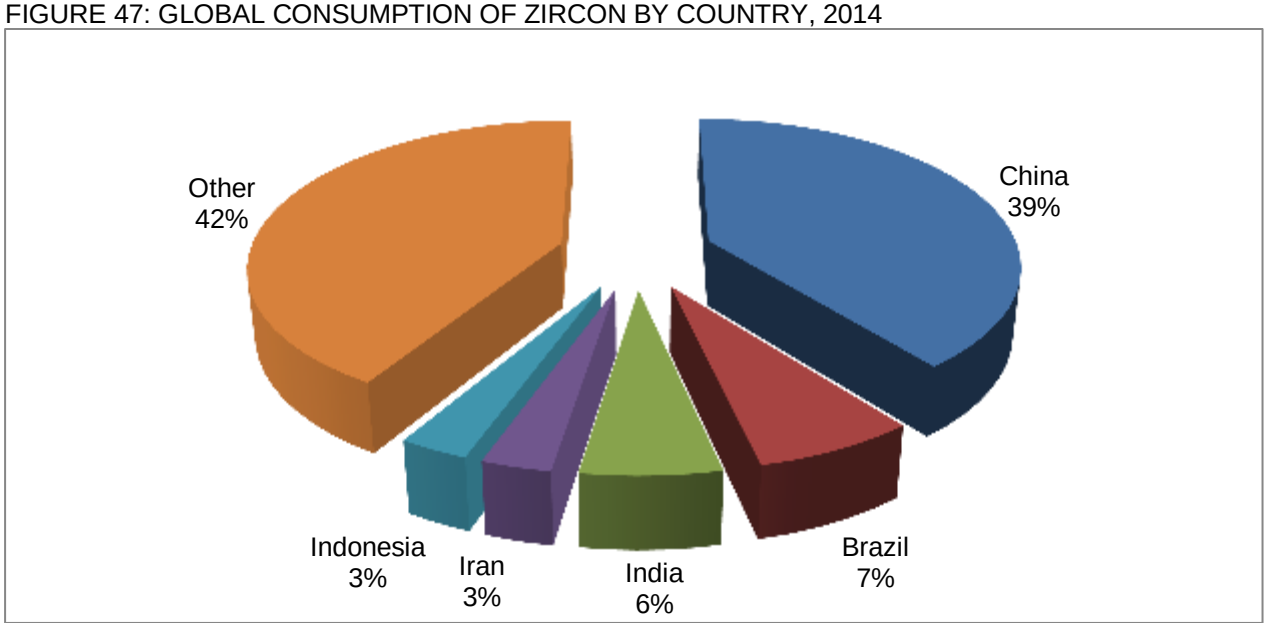
FIGURE 46: GLOBAL CONSUMPTION OF ZIRCON BY SECTOR IN 2014



Source: Iluka Estimates 2014

China remained the biggest consumer of zircon, responsible for 39 percent of the global consumption, followed by Brazil's 7 percent and India's 6 percent (Figure 47). Of the zircon produced in South Africa, 12 kt was consumed locally with 431 kt sold to the export market. Locally, zircon is used in foundries, ceramic tiles, and jewellery.

FIGURE 47: GLOBAL CONSUMPTION OF ZIRCON BY COUNTRY, 2014

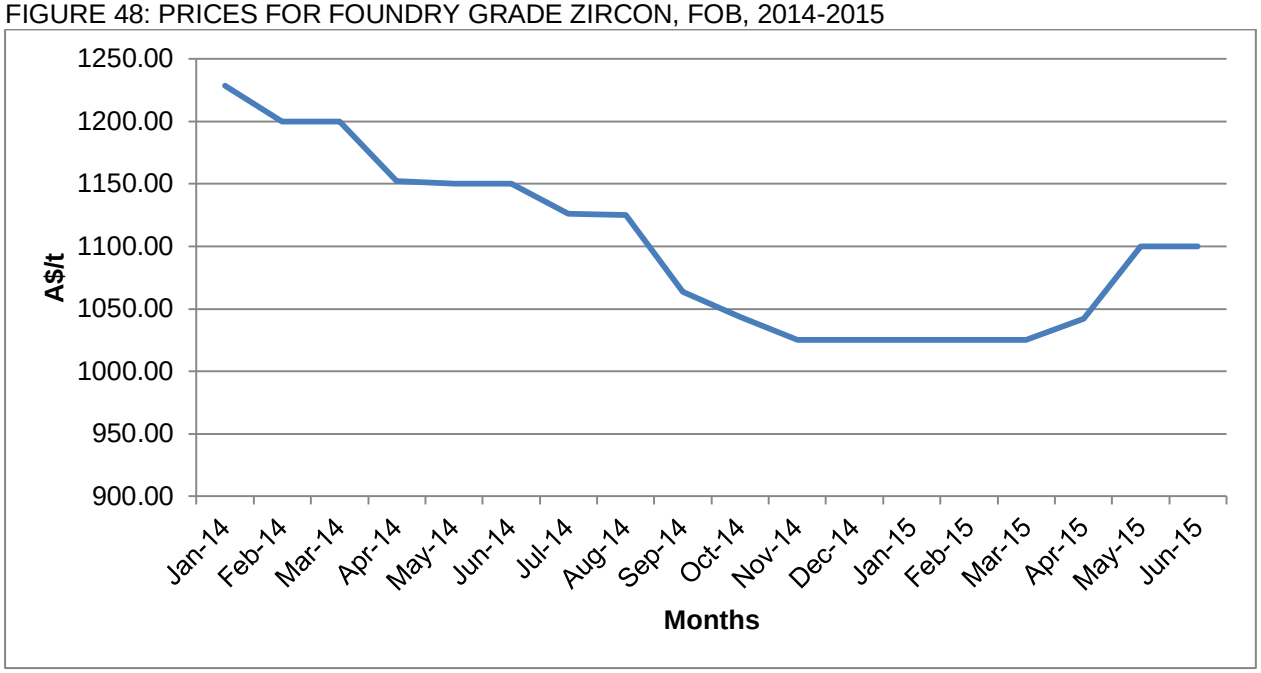


Source: Iluka estimates 2014

PRICES

According to Metal Bulletin average price for zircon in 2014 plummeted 25.7 percent to A$ 1 124/t compared with A$ 1 514/t in 2013 (Figure 48). As indicated earlier, supply outpaced consumption hence the sharp decline in prices during the reporting period. Furthermore, global construction activity and tile production were subdued in 2014, particularly in Spain, Italy and China. In the first half of 2015, zircon prices made marginal gains stabilising at 3 percent of 2014 levels as improvements in demand became evident.

FIGURE 48: PRICES FOR FOUNDRY GRADE ZIRCON, FOB, 2014-2015



Source: Metal Bulletin, 2014-2015

In Rand terms, the average price for zircon for local market in 2014 increased by 5 percent to R 11 768/t compared to 2013. However, average price for exports decreased by 3 percent to R 10 679 over the same period due to oversupply in global zircon market. As a result of the decline in unit price for exports, revenues decreased by 4 percent to R 4.7 billion compared with the previous year, 2013 (Table 62).

EMPLOYMENT

Employment in South Africa's zircon sector in 2014 increased by 123 percent to 399 employees compared with 179 employees recorded in 2013. Although a significant number of jobs were lost during the course of 2014 due to retrenchments, Tormin Mine filled the void as it came online at the beginning of that year. Employees received R 80 565 million in remuneration in 2014, a 91.3 percent increase compared with 2013 earnings (Table 63). Per capita earnings over the same period increased by 59.2 percent to R 374 722.

TABLE 63: SOUTH AFRICA'S ZIRCON SECTOR EMPLOYMENT, 2013-2014

	EMPLOYEE	REMUNERATION	
YEAR	Number	R'000	Per Capita Earnings
2013	179	2 113	235 271
2014	399	80 565	374 722
% change YY	123	91.3	59.2

Source: DMR, Mineral Economics Directorate

KEY DEVELOPMENTS IN AFRICA

Tormin Mine is owned by both Mineral Sands Commodities (50 percent) and BEE partner Blue Bantry Investments (50 percent) and is located at Vredendal in the Western Cape. The mine's primary commodities are zircon/rutile concentrates with garnet and ilmenite being secondary products. Mineral resource is estimated to be 4.9 Mt with mineral reserves measured and indicated at 2.7 Mt. Tormin Mine began production of zircon and rutile concentrate in January 2014 and produced 42 000 tonnes. By the end of 2014, Tormin Mine had employed 215 people, majority coming from local communities of Vredendal. The life of mine on this operation is projected to increase from the initial 5 years to 25 years due to high resource replenishment rate.

Fairbreeze Mine in KwaZulu Natal, which is owned by Tronox Limited, commenced a full scale mine construction in 2014 and the actual production is expected to start in the last quarter of 2015. Total initial investment for the development of this mine is R 2.45 billion. Fairbreeze Mine will provide titanium feedstock to Tronox KZN slag furnaces and produce zircon and pig iron as by product. Furthermore, Fairbreeze mine will preserve more than 1000 jobs which were lost at Hillendalle mine and this number is expected to increase to 2000 people when mine production comes online. Life of the mine is projected at 15 years.

Kwale Mineral Sands is a new mine owned by Base Resources limited, located in Kenya. The ore reserves at this project are estimated at 123 Mt with 52 percent being ilmenite, 14 percent rutile and 6 percent zircon. Total output for zircon in 2014 stood at 30 000 tonnes. The mine is expected to operate for next 13 years.

Grande Cote Mine is located in Senegal and owned by Tizir Limited. Primary commodities for this mine comprised of zircon, rutile and leucoxene, and ilmenite. Grande Cote Project has life of mine of over 25 years. It is estimated that on a yearly basis the mine will extract 50 Mt of sand resulting in 95 000 tonnes of zircon, 15 000 tonnes of rutile and leucoxene and 570 000 ilmenite; making Senegal one of the world's largest producers of these minerals. Production at Grande Cote Mine started in March 2014.

OUTLOOK

According to Iluka and other various sources, world zircon demand is expected to grow by 3.7 percent per year between 2015 and 2019 to approximately 1 815 kt. Chemicals sector demand is forecast to have the highest growth rate at 4.1 percent as demand for zirconium chemicals remains strong, closely followed by ceramics sector. Demand for foundries and refractories sectors will remain subdued. Southern Asia is expected to lead the demand over short to medium term due robust infrastructure and property activities in this region. Metal Bulletin expects zircon prices to remain constant in 2015 and gradually improve towards the year end to 2016 to A$ 1 300/t as the demand is slowly improving. South Africa's zircon production is forecast to increase by 15 percent to 457 Kt in 2015 with local demand improving by 3 percent due to the increased property development activities during this period.

REFERENCES

1. *Roskill: Zircon markets signal steady recovery by end of 2014, London, September 2014*
2. *Roskill: Global Industry Markets and Outlook Reports: Zirconium Concentrate, 2014*
3. *USGS, Mineral Commodity Summaries, p189, January 2015*
4. *www.iluka.com/investors-media/company-industry-information/market-characteristics*
5. *TZMI Congress 2014, Shanghai China, Summary by Robert Porter, November 2014*
6. *Metal Bulletin, various articles, 2014 -2015.*
7. *Industrial Minerals publications, 2014 - 2015*
8. *DMR Mineral Economics*

FERROUS METALS AND MINERALS OVERVIEW

L Malebo

GLOBAL DEMAND

South Africa is a major producer and supplier of primary ferrous minerals and their alloys. With more than 85 percent of global consumption of iron ore, manganese, chrome and vanadium; steel manufacturing is by far the leading demand driver of ferrous minerals. According to the World Steel Association (WSA), global crude steel production stood at 1 665 million tons (Mt) in 2014, a 1 percent increase compared with 2013. China remained the dominant crude steel producer, accounting for 49.4 percent of the world's total crude steel output in 2014, followed by Japan and the United States at 6.6 percent and 5.3 percent, respectively. China's steel production remained stagnant with a slight increase of 0.1 percent, while that country's steel apparent use declined by 3.5 percent due to its economic slowdown.

SOUTH AFRICA'S PRODUCTION AND SALES

South Africa's aggregated production of ferrous minerals increased by 13.0 percent to 108 848 kilotons (kt) (Table 64). Iron ore remained the leading contributor to ferrous production at 74.5 percent to ferrous minerals total production, followed by chrome ore and manganese at 13.0 percent and 12.5 percent, respectively. Ferrous total sales mass increased by 7.5 percent, with the corresponding revenues increasing slightly by 0.7 percent, due to the effect of low prices. The past decade saw ferrous metals prices hit record highs, due to China's rapid growth and development. However, the recent slow growth in Chinese economy impacted negatively on the ferrous metals demand, putting a downward pressure on prices. The average spot price of iron ore declined by 46 percent in 2014 compared with 2013, while chrome ore and manganese prices dropped by 0.2 percent and 15 percent, respectively over the same period.

TABLE 64: SOUTH AFRICA'S PRODUCTION AND SALES OF FERROUS MINERALS, 2013 AND 2014

COMMODITY	YEAR	PRODUCTION	LOCAL SALES		EXPORT SALES		TOTAL SALES	
		kt	kt	R million	kt	R million	kt	R million
CHROME ORE	2013	13 677	8 477	5 870	4 167	5 891	12 643	11 761
	2014	14 038	10 048	7 771	3 695	5 835	13 743	13 606
IRON ORE	2013	71 645	9 295	5 727	58 180	57 360	67 476	63 088
	2014	80 759	9 571	5 742	61 963	52 957	71 534	58 699
MANGANESE ORE	2013	10 957	2 042	1 506	7 961	12 970	10 004	14 476
	2014	14 051	1 967	1 644	9 644	14 734	11 611	16 379
TOTAL	2013	***96 279***	***19 814***	***13 103***	***70 308***	***76 221***	***90 123***	***89 325***
	2014	***108 848***	***21 586***	***15 157***	***75 302***	***73 526***	***96 888***	***88 684***

Source: DMR, Directorate Mineral Economics

Despite a sluggish growth in China, South Africa's aggregated production of ferroalloys increased by 17.1 percent to 4 824kt (Table 65). Chromium alloys contributed 77.0 percent to the ferroalloys total production, followed by manganese alloys at 20.1 percent. Total sales mass of ferroalloys stood at 4 644 kt, an increase of 17.9 percent compared with 2013. An increase in sales mass coupled with a weaker rand boosted the ferroalloy total sale revenue increasing by 26.7 percent to R 45.9 billion in 2014, compared with 2013.

TABLE 65: SOUTH AFRICA'S PRODUCTION AND SALES OF FERROALLOYS, 2013 AND 2014

COMMODITY	YEAR	PRODUCTION	LOCAL SALES		EXPORT SALES		TOTAL SALES	
		kt	kt	R million	kt	R million	kt	R million
CHROMIUM ALLOYS	2013	3 219	360	2 983	2 802	25 553	3 162	28 536
	2014	3 719	571	5 106	3 192	31 080	3 763	36 186
MANGANESE ALLOYS	2013	787	82	737	577	4 928	659	5 665
	2014	970	104	1 021	659	6 335	763	7 355
FERRO SILICON	2013	112	54	751	64	1 313	118	2 064
	2014	135	48	751	71	1 679	118	2 430
TOTAL	**2013**	**4118**	**496**	**4 471**	**3 443**	**31 794**	**3 939**	**36 265**
	2014	**4 824**	**723**	**6 878**	**3 922**	**39 094**	**4 644**	**45 971**

Source: DMR, Directorate Mineral Economics

EMPLOYMENT

Employment in the ferrous mineral sector stood at 50 416 in 2014, a 2.2 percent increase compared with 2013 (Table 66). The increase was notable across all the sectors with manganese, chrome and iron ore increasing employment by 1.3 percent, 1 percent and 3.1 percent, in their order. Total remuneration increased by 13.2 percent in 2014 compared with 2013, resulting in a 10.8 percent increase in the average remuneration per employee.

TABLE 66: SOUTH AFRICA'S FERROUS MINE EMPLOYMENT AND GROSS REMUNERATION 2007-2014

YEAR	AVERAGE NUMBER OF EMPLOYEES	TOTAL REMUNERATION (R'000)	REMUNERATION /EMPLOYEE
2009	31 003	4 745 558	153 0677
2010	39 459	6 524 615	165 3518
2011	46 713	10 536 930	225 5674
2012	51 864	9 692 127	186 8758
2013	49 324	10 634 969	215 6145
2014	50 416	12 041 059	238 8341

Source: DMR, Directorate Mineral Economics

OUTLOOK

The World Steel Association forecasts that global apparent steel use will increase by 0.5 percent to 1 544 Mt in 2015 following growth of 0 6 percent in 2014. In 2016, it is forecast that world steel demand will grow by 1.4 percent to reach 1 565 Mt. The steel industry was dominated by events in China as the major producer of steel at 48 percent of global market share for steel. However, the industry is now entering a period of pause due to the country's slow economic growth. Steel is by far the major demand driver for ferrous metals as such; slow growth from China is expected to negatively affect the metals demand in the medium term. The industry is expected to pick up again when markets other than China drive new demand. The ferrous metals and alloys prices are expected to moderate in 2015 and 2016 following a steady decline in 2014 as the steel market recovers slowly. South Africa's production and exports are expected to moderate in 2015 and 2016 in response to low prices as well as reduced demand from major steel producing countries.

REFERENCES:

1. *DMR Mineral Economics, 2014*
2. *USGS Mineral Commodity Summaries, January 2015*
3. *WorldSteel Association, 2015 Figures*

CHROMIUM

M Khaile

SUPPLY AND DEMAND

Global chrome ore reserves were estimated at 9 297 million tons (Mt) in 2014 (Table 67), with South Africa accounting for 73.7 percent followed by Zimbabwe and Kazakhstan at 10.2 and 4.2 percent, respectively. In 2014, global chrome ore production amounted to 23 000 kilotons (kt), 17.4 percent lower compared with 2013, with South Africa leading at 43.5 percent, followed by Kazakhstan and India at 19.3 and 8.3 percent, respectively.

World chrome ore exports stood at an estimated 7 267 kt in 2014, a 98.1 percent decline when compared to 2013, due to decreased export sales from South Africa, Turkey and Oman. The large slump is primarily attributed to weakened demand from the largest importer, China, whose chrome ore imports dropped by 22.4 percent in 2014 from 12.1 Mt in 2013.

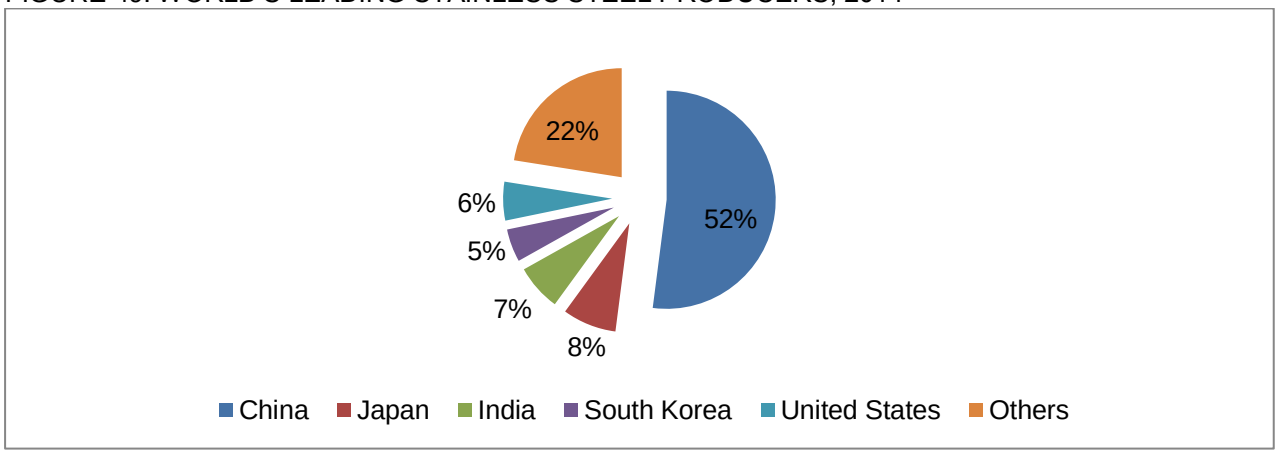
TABLE 67: WORLD CHROME ORE RESERVES, PRODUCTION AND EXPORTS, 2014

COUNTRY	RESERVES+			PRODUCTION#			EXPORTS#		
	Mt	%	Rank	kt	%	Rank	kt	%	Rank
South Africa	6 860	73.7	1	10 048	43.5	1	3 695	50.8	1
Kazakhstan	387	4.2	3	4 475	19.3	2	1 021	14.0	2
India	54	0.6	6	1 924	8.3	3	94	1.3	9
Turkey	220	2.4	4	1 745	7.5	4	106	1.5	8
Finland	120	1.3	5	1 035	4.5	5	0	0.0	
Oman	27	0.3	9	741	3.2	6	641	8.8	3
Albania	9	0.1	10	636	2.8	7	561	7.7	4
Pakistan	-	-	-	412	1.8	8	353	4.9	6
Brazil	18	0.2	7	520	2.3	9	14	0.2	11
Iran	-	-	-	494	2.1	10	494	6.8	5
Zimbabwe	930	10.2	2	528	2.3	9	0	0.0	
Australia	-	-	-	-	-	12	45	0.6	10
Russia	46	0.5	8	142	0.6	12	0	0.0	
Other	626	6.1		384	1.7	11	243	3.3	7
TOTAL: 2014	9 297	100		23 084	100		7 267	100	
2013	9 106			27 961			14 393		

*Source: +Heinz H. Pariser, 2015, # International Chromium Development Association, 2015, * Directorate Mineral Economics, DMR*

According to International Chromium Development Association (ICDA), an estimated 96 percent of total global chrome ore production was used in metallurgical applications to produce ferrochrome in 2014. World stainless steel production stood at 41.6 Mt, a 9.3 percent increase from 2013, driven mainly by increased capacity in Chinese output. China continues to lead the global stainless steel market, accounting for 52 percent of global production, followed by Japan and India at 8 and 7 percent, respectively (Figure 49).

FIGURE 49: WORLD'S LEADING STAINLESS STEEL PRODUCERS, 2014



Source: International Stainless Steel Forum, 2015

South Africa's chrome ore production increased marginally by 2.8 percent to 14.0 Mt in 2014 compared with 2013 (Table 68). Local sales volumes and revenue increased by 18.5 and 32.5 percent, respectively, in line with the 15.5 percent increase in the country's ferrochrome production in 2014. South Africa's chrome ore export mass fell to 3 695 kt in 2014 from 4 168 kt in 2013, responding to declining demand growth abroad, particularly China, while export revenue showed a marginal decrease of 1 percent during the same period.

TABLE 68: SOUTH AFRICA'S CHROME ORE PRODUCTION AND SALES, 2005 – 2014

YEAR	PRODUCTION	LOCAL SALES			EXPORT SALES		
		Mass	Value	Unit Value	Mass	Value	Unit Value
	Kt	kt	R' 000	R/t	kt	R' 000	R/t
2005	7 552	6 128	1 468 521	240	657	442 045	673
2006	7 418	6 384	1 802 385	282	735	499 519	679
2007	9 665	7 389	2 346 982	315	904	675 901	747
2008	9 683	7 116	4 131 019	581	762	1 267 931	1 664
2009	6 865	4 855	2 066 278	426	1 035	1 196 051	1 155
2010	10 871	7 267	4 159 308	572	1 929	2 459 473	1 275
2011	10 824	8 061	5 813 803	721	2 063	3 357 662	1 628
2012	11 310	6 685	4 683 023	701	2 470	3 594 282	1 455
2013	13 653	8 473	5 866 471	692	4 168	5 891 833	1 414
2014	14 038	10 048	7 771 424	773	3 695	5 834 876	1 579

Source: DMR Directorate Mineral Economics, 2015

Global ferrochrome production stood at 11.1 Mt in 2014, a 3.2 percent increase from 2013, with China, South Africa and Kazakhstan accounting for the bulk of the increment (Table 69). China's ferrochrome output increased slightly by 0.6 percent, while South Africa's production recorded a 15.5 percent increase reaching the 3 719 kt mark. South Africa accounted for 54.3 percent of global ferrochrome exports, which increased by 5.6 percent to 5 878 kt in 2014 when compared with 2013. Kazakhstan and India were the second and third largest ferrochrome exporters of 2014, each contributing 17.3 and 9.9 percent to total global exports, respectively. China feeds almost all of its ferrochrome output into its stainless steel industry and imports additional material from leading ferrochrome producers around the world.

TABLE 69: WORLD FERROCHROME PRODUCTION AND SALES, 2014

COUNTRY	PRODUCTION#			EXPORTS#		
	kt	%	Rank	kt	%	Rank
China	4 006	36.9	1	2	0.5	9
South Africa*	3 719	33.4	2	3 192	54.3	1
Kazakhstan	1 124	10.7	3	867	17.3	2
India	806	9.0	4	434	9.9	3
Russia	194	4.3	5	102	4.7	5
Finland	441	4.0	6	273	3.9	6
Brazil	167	1.5	7	9	0.3	11
Zimbabwe	231	1.4	8	223	2.3	7
Turkey	93	1.3	9	90	2.0	8
Sweden	69	0.5	10	77	0.7	9
Albania	28	0.1	11	32	0.4	10
Other	253	0.4		667	7.7	4
TOTAL: 2014	11 131	100		5 878	100	
2013	10 789			5 567		

*Source: ICDA 2015, *DMR Directorate Mineral Economics, 2015*

South Africa's ferrochrome production grew by 15.5 percent to 3 719 kt in 2014,in line with an 18.6 percent increase in chrome ore domestic sales in the same year, an indication of greater input absorption by the local industry (Table 70). Revenue from local sales was up 71.1 percent from 2013 to R5 105.6 million in 2014, while local sales volumes also showed a 58.6 percent increase to 571 kt in 2014 despite a 4.1 percent decline in local stainless steel production. South Africa's ferrochrome exports rose to 3 192 kt in 2014 from 2 802 in 2013, with most of the exports destined for China.

TABLE 70: SOUTH AFRICA'S FERROCHROME PRODUCTION AND SALES, 2005 – 2014

YEAR	PRODUCTION	LOCAL SALES			EXPORT SALES		
		Mass	Value	Unit Value	Mass	Value	Unit Value
	kt	kt	R' 000	R/t	kt	R' 000	R/t
2005	2 802	358	1 421 676	3 968	2 480	9 923 290	4 001
2006	3 030	353	1 352 224	3 832	2 581	10 370 421	4 017
2007	3 561	395	1 995 161	5 047	2 972	15 534 184	5 227
2008	3 269	334	3 415 822	10 227	2 525	28 355 767	11 230
2009	2 346	432	2 252 973	5 215	2 621	15 881 599	6 059
2010	3 607	397	2 851 837	7 183	3 116	24 216 069	7 772
2011	3 422	448	3 413 684	7 620	3 037	23 738 853	7 817
2012	3 063	443	3 402 210	7 677	2 745	22 290 876	8 120
2013	3 219	360	2 983 322	8 286	2 802	25 552 642	9 120
2014	3 719	571	5 105 685	8 937	3 192	31 079 849	9 737

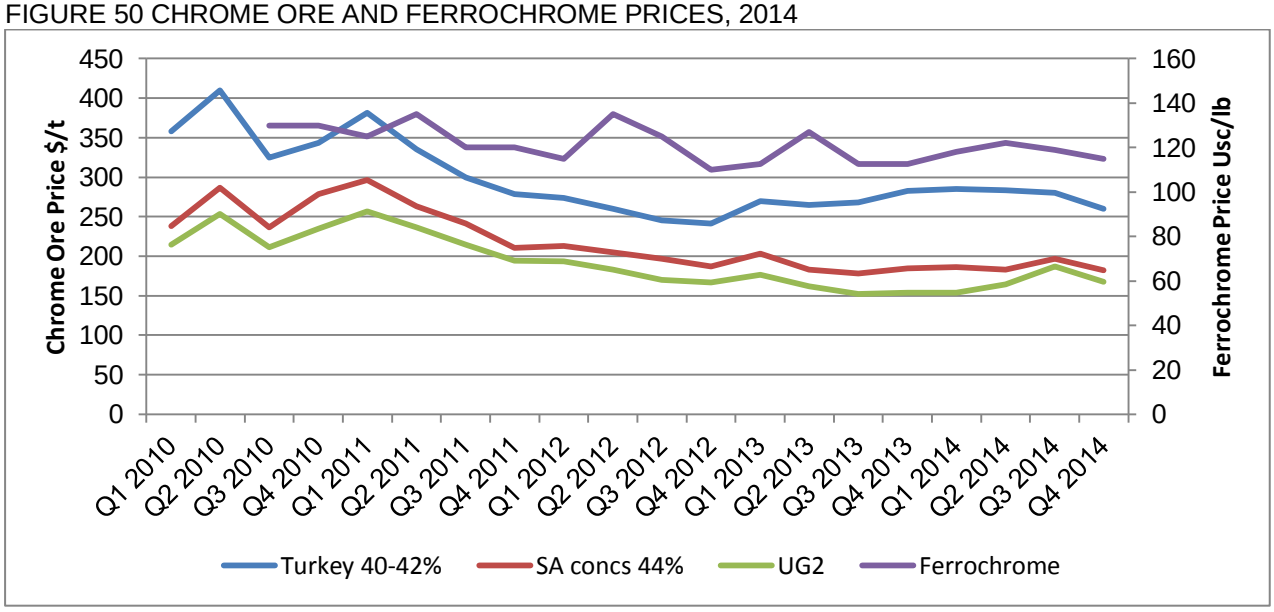
Source: DMR Directorate Mineral Economics, 2015

PRICES AND REVENUES

Chrome ore prices remained depressed for most of 2014, as the market oversupply persisted, averaging at $187.2/t, a marginal 0.2 percent decline from 2013. The price of Upper Group 2 (UG2) chrome averaged $153.5/t in the first quarter of 2014 (Figure 50), then found respite in quarter 2 , bouncing back by 7.2 percent to $164.4/t. Production interuptions in the platinum sector, leading to sluggish UG2 chrome supply, caused the temporary price increase in UG2 chrome. Primary chrome ore prices stood at $186.5/t in quarter 1 of 2014, a 0.8 percent increase compared to quarter 4 of 2013, then peaked at $197.1 in quarter 3, benefiting from slashed UG2 chrome supply. The ferrochrome price increased to $118/t in the first

quarter of the year, and again by 3.4 percent in quarter 2, responding to the uptick in UG2 and primary chrome ore prices.

FIGURE 50 CHROME ORE AND FERROCHROME PRICES, 2014



Source: CRU Mining Group, 2015

EMPLOYMENT

South Africa's chrome industry employment increased by a marginal 1.4 percent to 18 623 in 2014 compared with 2013, with remuneration also increasing by 5.2 percent (Table 71). The increase in employment was effected by a 1.9 percent increase in permanent labour and a slight increment in the number of contract workers from 7 223 to 7 282 in 2014. Average remuneration per employee amounted to R 216 875 in 2014, which resulted from the 5.2 percent increase in total remuneration.

TABLE 71: EMPLOYMENT IN SOUTH AFRICA'S CHROME INDUSTRY, 2014

YEAR	EMPLOYEES	TOTAL REMUNERATION R' 000	AVERAGE REMUNERATION R/employee
2010	13 982	2 082 481	148 940
2011	16 911	2 754 694	162 893
2012	19 758	3 430 889	173 645
2013	18 357	3 840 461	209 210
2014	18 623	4 038 859	216 875

Source: DMR Directorate Mineral Economics, 2015

KEY DEVELOPMENTS

Glencore Merafe's Lion II ferrochrome plant project, which is expected to increase the company's total installed capacity to over 2.3 million tons per annum, started production on its first and second furnaces on 6 April 2014 and 30 May 2014, respectively. Ferrochrome production reached more than 80 percent of designed capacity in quarter 1 of 2015 and full capacity in quarter 2.

Afarak has completed the installation of its ferroalloy refining and granulation plant in South Africa. The project, which is now fully operational, is expected to produce an estimated 18 000 tons of medium ferrochrome per annum

OUTLOOK

CRU expects world stainless steel production to rise by 4.2 percent to 44 044 kt in 2015 and reach 47 161 kt by 2016. These are much slower growth rates compared to the last few years when Chinese stainless steel production was more robust. Albeit sluggish growth, China is still expected to remain the driver of

stainless steel production globally. Chinese stainless steel industry has several new projects that are coming on stream, which will add an estimated 1.2 Mt to global production. This is likely to create demand for chrome ore and ferrochrome in China. Global demand for ferrochrome is expected to increase by only 1.2 percent, with the exception of China whose ferrochrome demand growth rate is to reach 6 877 kt in 2015, an increase of 19.6 percent from 2014, a further 33.5 percent in 2016 to 9 179 kt.

An oversupplied chrome ore market will continue to push prices down, with 9 Mt of expected new supply in 2016 further exacerbating the situation. Chrome ore prices are expected to drop by at least 9 percent in 2015, while the UG2 chrome price will decline by a marginal 0.8 percent during the same period. With some of South Africa's platinum mines shutting down, supply shortages are expected to boost prices for the 44% and 40-42% chrome ore grades.

REFERENCES

1. *DMR Mineral Economics, 2015*
2. *ICDA Overview of the Chromium Industry, 2015*
3. *ICDA Statistical Bulletin, 2015*
4. *Worldsteel Association*
5. *International Stainless Steel Forum*
6. *CRU, Ferrochrome Market Outlook, 2015*
7. *ICDA, Analysis of the Global Ferrochrome Market, 2015*
8. *Heinz H. Pariser, ICDA Members Meeting Presentation, Cape Town, March 2015*
9. *United States Geological Survey, Mineral Commodity Summaries, Chromium, February 2015*
10. *Presentation by Jacky Han, African Ferroalloys and Chromite Conference 2015, Johannesburg*

IRON ORE

L Malebo and RC Ravhugoni

SUPPLY AND DEMAND

Global iron ore reserves were estimated at 81 billion tons in 2014, with Australia accounting for 25 percent of the world's reserves, followed by Brazil and Russia at 18.4 percent and 16.13 percent respectively. South Africa holds 650 million tons (Mt) of known iron ore reserves; contributing just 0.74 percent to global reserves (Table 72). Global iron ore production increased by 41 percent to 3 142 Mt in 2014 compared with 2013, mainly due to a spike in Australia's output. China was the largest producer at 1 500 Mt, contributing about 47.7 percent to the total world production, followed by Australia and India at 19.4 percent and 4.8 percent respectively. South Africa, at 78 Mt an increase of 11.4 percent compared with 2013, accounted for 2.5 percent of global iron ore production, positioning it as the seventh global producer. Global iron ore exports stood at 1 392 Mt , with Australia contributing 54 percent to total exports, followed by Brazil and South Africa at 24.7 percent and 4.7 percent, respectively.

TABLE 72: WORLD IRON ORE RESERVES, PRODUCTION AND EXPORTS, 2014

COUNTRY	RESERVE#			PRODUCTION+			EXPORTS+		
	Mt	%	Rank	Mt	%	Rank	Mt	%	Rank
Australia	23 000	25,61	1	609	19.38	2	753	54.1	1
Brazil	16 000	18.44	2	317	10.08	3	344	24.71	2
China	7 200	8.29	4	1 500	47.7	1	0	0	11
India	5 200	5.99	5	150	4.77	4	10	0.72	10
Russia	14 000	16.13	3	105	3.32	5	23	1.65	7
Ukraine	2 300	2.65	6	82	2.6	6	41	2.94	4
South Africa	650	0.74	11	78	2.48	7	66	4.66	3
Iran	1 400	1.61	10	45	1.43	9	23	1.58	8
United States	2 100	2.42	9	58	1.84	8	12	0.86	9
Canada	2 300	2.65	6	41	1.3	10	40	2.87	5
Sweden	2 200	2.53	8	26	0.82	11	24	1.72	6
Other	9 500	10.95		131	4.16		57	10.7	
TOTAL:2014	86 750	100		3 142	100		1 392	100	
2013	81 000			1 850			1 195		

Sources: + CRU, 2014
** DMR Directorate Mineral Economics, 2014*
 # USGS, 2010 (Reserve – Iron content)

Iron ore is the main ingredient in crude steel manufacturing, which makes up 95 percent of the metals used in the world per year, and the remainder is used in the cement, pigments, chemicals and agriculture industry. The global crude steel production output reached 1 665 Mt in 2014, an increase of just 1 percent when compared to 2013. Despite the slow growth in the Chinese economy, it remained the leading steel producer contributing about 49.3 percent to total global steel production, followed by EU 28 and Japan at 10.2 percent and 6.6 percent, respectively.

South Africa's iron ore production declined by 12.9 percent to 80.7Mt in 2014, compared with 2013 (Table 73), as some high cost producers closed down in response to low prices. Despite a 4.1 percent decline in local stainless steel production, iron local sales mass increased by 3 percent to 9.6 Mt in 2014 compared with 2013. Export sales increased by 6.5 percent to 62 Mt in line with a 1.2 percent increase in world steel production.

TABLE 73: SOUTH AFRICA'S PRODUCTION AND SALES OF IRON ORE

YEAR	PRODUCTION	LOCAL SALES			EXPORT SALES		
		Mass	Value	Unit Value	Mass	Value	Unit Value
	kt	kt	R'000		Kt	R' 000	R/t
2004	39 322	12 431	1 145 600	92	24 745	3 439 885	124
2005	39 542	12 009	1 272 796	106	26 628	6 246 776	235
2006	41 372	12 036	1 398 450	116	27 371	8 532 277	312
2007	42 083	12 407	1 749 498	141	29 724	11 680 793	393
2008	48 983	11 258	1 974 629	175	32 766	20 267 206	619
2009	55 313	8 369	1 888 801	226	44 550	25 242 934	567
2010	58 709	10 561	3 270 746	310	47 493	40 148 279	845
2011	58 057	9 844	4 207 746	427	51 763	58 444 148	1126
2012	67 100	8 393	4 448 978	530	57 110	48 193 830	844
2013	71 543	9 295	5 782 442	622	58 180	57 385 286	986
2014	80 759	9 571	5 741 815	600	61 962	52 957 447	855

Source: DMR Directorate Mineral Economics, 2014

PRICES AND REVENUE

The past decade saw iron prices hit record highs, due to China's rapid growth and development. However, the recent slow growth in Chinese economy impacted negatively on the iron ore demand, putting a downward pressure on prices. Iron ore price dropped by 46 percent from $136 per tonne ($/t) in 2013 to $73/t in 2014. Despite the weaker rand to dollar exchange rate (R/$) and an increase in the export mass, South Africa's total sales revenue decreased by 7.4 percent from R63 billion in 2013 to R58 billion in 2014, due to very low iron prices (Table 73).

EMPLOYMENT

Employment in South Africa's iron ore industry increased by 3 percent from 21 145 in 2013 to 21 794 in 2014 (Table 74). Permanent employees contributed about 51 percent; a decline from 53 percent contributed in 2013.The number of contractors saw an increase, from a contribution of about 47 percent in 2013 to a total contribution of about 49 percent in 2014. Total remuneration increased by 15 percent in 2014 compared with 2013, resulting in a 12.3 percent increase in the average remuneration per employee.

TABLE 74: SOUTH AFRICA'S IRON ORE INDUSTRY'S EMPLOYMENT AND REMUNERATION

YEAR	EMPLOYEES	TOTAL REMUNERATION	AVERAGE REMUNERATION
		R'000	R/Employee
2008	13 256	1 667 836	125 817
2009	13 727	2 178 041	158 668
2010	18 216	3 037 417	166 744
2011	22 361	6 506 607	290 980
2012	23 380	4 690 572	200 923
2013	21 145	4 845 091	229 136
2014	21 798	5 659 707	261 063

KEY DEVELOPMENTS

Ironveld is a new pig iron project located on the Northern Limb of the Bushveld Complex in the Limpopo Province. Ironveld expects to mine its own magnetite resource at approximately 2.4 million tons magnetite per annum as feedstock for its pig iron plant to produce 1 Mt of pig iron annually, with a life of mine of about 25 years expected, although the number of jobs to be created is not stated.

The R4.2 billion project of Kumba Iron Ore, which is an important element of Sishen mine's western expansion plans, is expected to ramp up production to 37 Mt by 2016 from the current 35 Mt Kolomela mine's life of mine (LoM) production capacity is expected to increase to 13 Mt in 2017 from the current 11, 1 Mt in 2015. Sishen mine continued to perform well against its operational plan and remained on track to increase production to 35 mt in 2014, 36Mt in 2015 and 37Mt from 2016. Kolomela mine's life of mine (LoM) production capacity was increased to 11 Mtpa from 2015. Studies were in progress at Kolomela, which could result in increasing production further to 12 Mt in 2016 and to 13mtpa from 2017

OUTLOOK

World Steel forecasts that global apparent steel use will increase by 0.5 percent to 1,544 Mt in 2015 following growth of 0.6 percent in 2014, and is expected to grow by a further 1.4 percent in 2016. Chinese steel demand in 2014 saw negative growth for the first time since 1995 due to government's rebalancing efforts that had a major impact on the real estate market. This situation is likely to remain unchanged in the short term and Chinese steel use will continue to record negative growth in 2015 and 2016, with no strong rebound expected in the medium term.

The planned capacity expansions and new projects from global iron ore major producers in Australia and Brazil are expected to boost iron ore output and exports, increasing by 12.4 percent and 13.2 percent, respectively, by 2018. Increased iron ore supply from these majors is expected to oversupply the market, due to reduced demand from China, and will impact negatively on the ore price in the next few years.

Given the bleak global outlook, South Africa's iron ore production is expected to moderate in the next five years, despite future growth brownfield expansion plans at Kumba. The country's iron production is expected to flat-line at 70Mt from 2016, with miners looking to supply the Indian market as China's demand growth for iron ore eases in the coming years. The African continent poses as the next potential market for steel, through the Programme of Infrastructure Development in Africa (PIDA) as well the drive for rapid urbanization, which present added demand opportunities for infrastructure inputs such as iron ore. This is expected to boost prices and demand in the medium term.

REFERENCES

1. *Department of Mineral Resources, Directorate Mineral Economics, 2015*
2. *Bureau of Resources and Energy Economics, Resources and Energy Quarterly March, June and December 2015*
3. *Creamer Media's Research Channel Africa, A Review of the Iron Ore Sector, 2015*
4. *Creamer Media's Research Channel Africa, Real Economy Insight: Iron-ore, 2015*
5. *CRU, Iron Ore Market Outlook, April 2015*
6. *Iron & Steel Statistics Bureau, World Steel Review, 2014*
7. *United States Geological Survey, Mineral Commodity Summaries: Iron Ore, February 2014*
8. *World Steel Association, Steel Statistical Yearbook, 2014*
9. *World Steel Association, World Crude Steel Production - Summary, 2015*
10. *World Steel Association, World Steel in Figures 2015*

MANGANESE ORE

L Malebo and RC Ravhugoni

SUPPLY AND DEMAND

According to the latest USGS data, the global manganese reserves stood at 570 million tons (Mt) in 2014 (Table 75). South Africa, Ukraine, Australia, Brazil and India are the big five manganese ore reserves countries, amounting to 490 million tons, jointly accounting for 86 percent of total reserves. Manganese ore global production increased by 9 percent to an estimated 59.2 Mt in 2014, due to increased production, particularly from China and South Africa by 20.5 Mt and 13.5 Mt, respectively. China was the leading producer at 20, 5 Mt, followed by South Africa and Australia at 13.5 Mt and 7.4 Mt, respectively. South Africa's production increased by 23.6 percent compared with 2013, due the companies ramping up production (Table 76).

TABLE 75: WORLD MANGANESE ORE RESERVES, PRODUCTION AND EXPORTS, 2014

COUNTRY	RESERVE#			PRODUCTION+			EXPORTS+		
	Mt	%	Rank	Mt	%	Rank	Mt	%	Rank
China	44	7.7	6	20.5	34.7	1	0.0	0	
South Africa	150	26.3	1	13.5	22.9	2	9.2	30	1
Australia	97	17.0	3	7.4	12.7	3	7.1	23	2
Gabon	24	4.2	7	3.8	6.4	4	3.3	11	3
India	49	8.6	5	1.6	2.7	5	0.0	0	
Brazil	54	9.4	4	2.8	4.7	6	2.0	7	4
Ukraine	140	24.5	2	1.3	2.2	8	0.0	0	
Other	92	16.1		8.1	13.7		9.0	20	
2014	570	100		59	100		31	100	
2013	650			54	100		29		

Sources: + CRU Group, 2014
** DMR, Mineral Economics, 2014*
 # USGS, 2014

Global manganese exports increased by 6.4 percent in 2014 compared with 2013, due to improved demand from manganese alloys, which grew by 7 percent to reach 19.5 Mt in 2014. South Africa at 9.2 Mt was the leading exporter, contributing 30 percent to total global manganese exports, followed by Australia and Gabon at 23 percent and 11 percent respectively. Approximately 90 percent manganese ore is used in the production of iron ore and steel, with the balance of demand coming from non-ferrous alloys, batteries and other small-scale applications. Due to the low grade quality of China's manganese ore, the country imports most of the ore, as the domestic manganese ore supply is far from meeting its domestic demand. China's manganese imports increased by 10.3 percent to 17.3 Mt in 2014, which is approximately 60 percent of total global manganese imports.

TABLE 76: SOUTH AFRICA"S MANGANESE ORE PRODUCTION AND SALES, 2004 – 2014

YEAR	PRODUCTION	LOCAL SALES			EXPORT SALES		
	Mass	Mass	Value		Mass	Value	
	kt	kt	R' 000	R/kt	kt	R' 000	R/kt
2004	4 282	w	656	w	2 403	1 082	450
2005	4 612	w	681	w	2 119	1 519	717
2006	5 213	w	727	w	2 846	1 518	534
2007	5 996	w	934	w	3 691	2 636	714
2008	6 807	w	1 761	w	4 689	15 581	3 323
2009	4 579	w	583	w	3 976	5 003	1 258
2010	7 172	w	1 320	w	5 986	9 340	1 560
2011	8 652	w	1 325	w	6 773	8 569	1 265
2012	8 943	w	1 134	w	7 498	9 685	1 292
2013	10 957	w	1 506	w	7 917	12 909	1 631
2014	13 549	w	1 605	w	9 296	14 309	1 539

Source: DMR, Mineral Economics, 2014, w - withheld

World manganese alloys output amounted to 19.5 Mt in 2014, up by 6.56 percent from 18.23 Mt in 2013, with China at 11.2 Mt the leading producer, accounting for 57 percent of global manganese alloy production. Despite a 3 percent decline in the manganese ore local sales, South Africa's manganese alloy output increased by 19.5 percent, with high and medium carbon ferromanganese production at 78 percent, constituting the bulk of the country's total manganese alloy production. Manganese alloys total sales mass increased by 15.4 percent, with most of the increase being from exports in line with an increase in crude steel production by 1.2 percent in 2014 (Table 77).

TABLE 77: SOUTH AFRICA"S MANGANESE ALLOYS PRODUCTION AND SALES, 2004 – 2014

YEAR	PRODUCTION	LOCAL SALES			EXPORT SALES		
	Mass	Mass	Value		Mass	Value	
	kt	kt	R' 000	R/kt	kt	R' 000	R/kt
2004	986	192	932	4 854	754	4 329	5 741
2005	845	165	722	4 376	559	2 791	4 993
2006	934	159	581	3 654	705	3 116	4 420
2007	1027	367	1 051	2 863	1493	5 403	3 619
2008	762	126	1 768	14 031	682	11 904	17 455
2009	393	68	598	8 794	413	3 625	10 211
2010	790	65	599	9 215	759	7 073	9 319
2011	1064	54	485	8 981	854	7 409	8 676
2012	883	61	527	8 639	681	6 154	9 037
2013	844	90	815	9 056	624	6 092	9 756
2014	1009	115	1 105	10 036	714	7 591	10 632

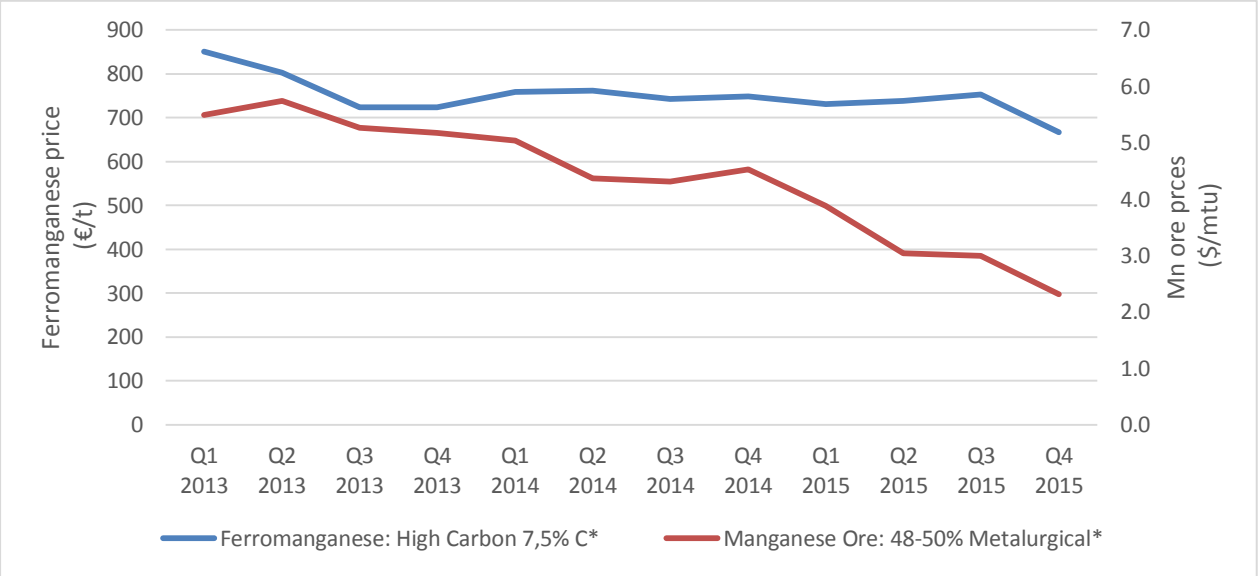
Source: DMR Directorate Mineral Economics, 2014

PRICES AND REVENUE

Manganese ore price averaged US$4.56/mtu in 2014, a 15 percent decline compared with 2013 (Figure 51). Manganese ore prices declined steadily from the first quarter of 2013, and dipped further into the third quarter of 2014 before increasing slightly in the fourth quarter of 2014. Prices did not show any sign of improvement as they continued on a declining trend in 2015, closing the year at US$3.06/mtu, a 33 percent drop compared with 2014. The drop in the manganese ore price is attributed to an oversupplied market as Chinese manganese ferroalloy producers reduced consumption, in response to the country's challenging domestic market, despite increased imports to that country. Notwithstanding decreased prices, manganese ore export revenues increased by 10.8 percent in 2014, due to higher export mass coupled

with a weakened Rand dollar exchange. Ferromanganese prices also remained weak in 2014 dropping by 2.9 percent compared with 2013, due to weak demand from steel. However, the manganese alloy export revenues increased by 24.6 percent in 2014, due to higher export mass coupled with a weakened Rand dollar exchange.

FIGURE 51: AVERAGE MANGANESE ORE AND MANGANESE ALLOYS PRICES 2013-2015



Source: Metal Bulletin

EMPLOYMENT

Employment in South Africa's manganese ore industry increased by 1 percent from 9 866 in 2013 to 9 966 in 2014 (Table 78). Permanent employees and contractors contributed about 12.3 percent and 5 percent, respectively to total ferrous employment. Permanent employees increased by 7, 5 percent while contractors saw a significant decline of 4.3 percent in 2014 compared with 2013. Despite a minimal increase in employment, total remuneration increased by 18 percent in 2014 compared with 2013.

TABLE 78: SOUTH AFRICA"S MANGANESE ORE INDUSTRY"S EMPLOYMENT AND REMUNERATION

YEAR	EMPLOYEES	TOTAL REMUNERATION R'000	AVERAGE REMUNERATION R/employee
2008	3 976	671 654	168 927
2009	4 988	731 618	146 676
2010	5 879	946 139	160 476
2011	7 460	1 277 636	171 257
2012	8 685	1 565 264	179 998
2013	9 866	1 948 537	194 903
2014	9 966	2 302 514	231 036

Source: DMR Directorate Mineral Economics, 2014

KEY DEVELOPMENTS IN SOUTH AFRICA

Tshipi é Ntle Manganese Mining (Pty) Ltd (Tshipi) is presently constructing a new open pit manganese mine in the Kalahari Manganese Field (KMF) located in the Northern Cape. The company owns two manganese properties in the KMF which are; Tshipi Borwa presently in the construction phase and Tshipi Bokone, which is still at exploration phase. The Tshipi Borwa open pit mine has been designed to produce 2.5 million tons per annum (mtpa) of 37 percent manganese ore grading.

In February 2014 the Assmang's Black Rock Expansion Project was commissioned to increase the output of high-grade manganese ore products. This project aims to ensure the mine's sustainable longevity. Current mining operations produce approximately 3.2 mtpa. The expansion project will lead to increased output to 4.6 million tons (mt). A total of R6.7bn will be invested in the expansion project.

The Port Elizabeth manganese export terminal has a single berth and a current capacity of 6mtpa. This terminal will be decommissioned in 2018 and relocated to the new terminal in Ngqura. A new manganese export terminal is planned for Ngqura, with an initial capacity of 16 mtpa in 2019 and stepping up to 22 mtpa by 2022. The Development Framework Plan makes provision for additional terminal facilities in the longer term along the berths in the river basin, to meet the future requirements of the Industrial Development Zone (IDZ) and hinterland.

OUTLOOK

According to the World Steel Association, global steel production is likely to remain flat in 2016. Global manganese ore and alloy imports to China are expected to follow a downward trajectory, which is likely to instigate a decline in South Africa's ferrous minerals and ferroalloys production and exports in the medium term. Low manganese prices have negatively impacted markets and viability of most companies. In South Africa most of the companies have put projects on hold while some have announced plans to reduce production and exports in 2016, due to challenging market conditions. An oversupplied market is expected to depress prices further into 2016, however benchmark ore prices are expected to rise through to 2018, due to a tightening in the global supply/demand balance and the levels of output required from China's mining industry.

REFERENCES

1. CRU, Manganese Ferroalloy Market Outlook, July 2015
2. Department of Mineral Resources, Directorate Mineral Economics, 2015
3. United States Geological Survey, Mineral Commodity Summaries: Manganese, February 2015
4. World Steel Association, Steel Statistical Yearbook, 2014
5. World Steel Association, World Crude Steel Production - Summary, 2015

SILICON

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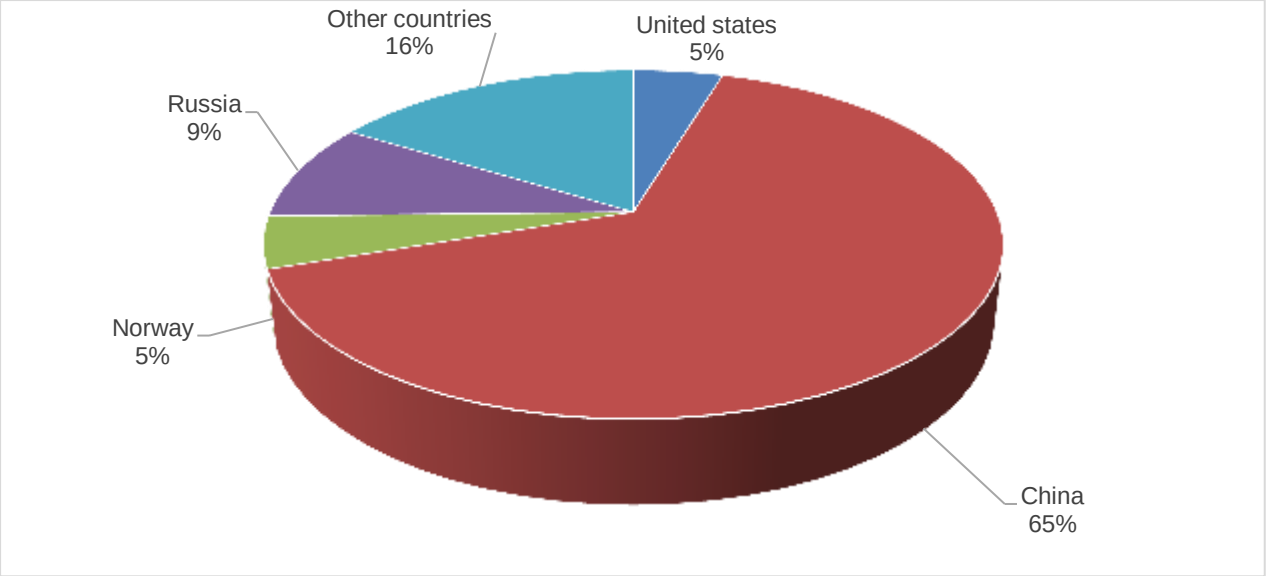
DEMAND AND SUPPLY

Sources of silicon are not quantitatively estimated due to their abundance and are reported to be adequate to supply world demand for decades. A slight decrease in silicon (silicon metal and ferrosilicon) production occurred in 2014 by 2.5 percent, from 7.8 million tons (Mt) in 2013 to about 7.6 Mt, owing to reduced demand from most steel producing countries. China continued to dominate the market, contributing 65 percent to global silicon output, while other producing countries such as Russia, USA, Norway, etc. contributed less than 10 percent (Figure 52).

FIGURE 52: GLOBAL SILICON PRODUCTION PERCENTAGE BY COUNTRY 2014



Source: USGS Geological Survey 2014

South Africa's silicon metal production increased by 38 percent, to 47.2 percent in 2014 (Table 79). Local sales mass decreased by 23 percent to 1.6 kilo tons (kt), while export mass increased by 29 percent to 40.8 kt in 2014 compared with 2013, bringing the total sales volume to 42.2 kt, a 26.3 percent drop compared with the previous year .

TABLE 79: SOUTH AFRICA'S PRODUCTION AND SALES OF SILICON METAL, 2004 – 2014

YEAR	PRODUCTION	LOCAL SALES			EXPORT SALES		
	Mass	Mass	Value		Mass	Value	
	kt	kt	R'000	R/t	kt	R'000	R/t
2004	50.5	8.8	65 414	7 403	45.9	389 430	8 473
2005	53.5	5.5	47 881	8 716	41.6	450 200	9 556
2006	53.3	7.8	72 270	9 213	47.4	503 583	10 622
2007	50.3	8.9	101 794	11 498	46.3	570 763	12 319
2008	51.8	3.9	87 443	22 438	53.5	1213 107	22 669
2009	38.6	6.4	91 586	14 310	38.4	640 413	16 677
2010	46.4	10.8	106 016	9 816	62.4	822 406	13 187
2011	58.8	10.6	66 576	6 283	63.1	1073 668	17 008
2012	53.0	15.1	62 044	4 099	59.4	928 424	15 641
2013	34.1	2.1	26 354	12 604	31.3	809 719	25 882
2014	47.2	1.6	41 381	25 663	40.8	1183 683	29 011

Source: DMR, Directorate Mineral Economics

South Africa's ferrosilicon production increased by 12 percent to 87.7 kt in 2014 (Table 80), due to its use in silicon rich construction steels in China. Local sales mass decreased by 11.2 percent to 46 kt, while export mass decreased by 7.7 percent to 29.83 kt in 2014 compared with 2013, bringing the total sales volume to 76.09 kt, a 8.9 percent drop compared with the previous year .

TABLE 80: SOUTH AFRICA'S PRODUCTION AND SALES OF FERROSILICON, 2004 - 2014. -

YEAR	PRODUCTION	LOCAL SALES			EXPORT SALES		
	Mass	Mass	Value		Mass	Value	
	kt	kt	R'000	R/t	kt	R'000	R/t
2004	140.6	84.3	436 095	5174	57.8	268 786	4 648
2005	127	73.4	388 446	5 293	41.3	223 216	5 401
2006	148.9	79.5	444 261	5 585	49.0	301 534	6 153
2007	139.6	91.7	616 444	6 724	54.7	395 352	7 222
2008	134.5	71.2	842 183	11 835	44.2	512 037	11 573
2009	110.4	60.9	659 855	10 835	43.6	460 901	10 571
2010	127.7	63.6	710 333	11 169	59.2	631 765	10 672
2011	126.2	57.3	693 448	12 111	67.0	811 277	12 115
2012	83.1	57.2	702 315	12 269	32.7	436 858	13 360
2013	78.4	52.1	724 560	13 941	32.4	503 142	17 128
2014	87.7	46.3	709 886	15 332	29.8	495 148	16 615

Source: DMR, Directorate Mineral Economics

PRICES AND REVENUE

Silicon metal price decreased by 8.2 percent in 2014.compared with 2013, attributed to deteriorating market fundamentals. The increase in total sales mass coupled with a weak rand dollar exchange, offset the effect of low prices, bringing the total sales revenue to R 1 225 million, a 46 percent increase compared with 2013. Ferrosilicon local sales and export revenue declined by 2 percent and 1.6 percent, respectively due to a 9.9 percent drop in the total sales mass and low prices.

OUTLOOK

According to CRU, global silicon demand is expected to remain significantly flat in 2015, reflecting a deceleration in global economic growth, in most emerging countries, despite a gain of more than 14 percent year on year in 2014. Demand in Asia is expected to be lower compared to the previous two years and, silicon demand from US and EU is expected to contract as well in 2015. Although total silicon production outside China contracted in 2014, the completion of new silicon plants in the USA and Bosnia, combined with recent and pending restarts to idling furnaces in Brazil are expected to boost supply in the next 5 years. Prices are expected to remain stagnant in 2015 into 2016 however, could increase provided export demand stays strong.

REFERENCES

1. *DMR, Mineral economics*
2. www.roskill.com
3. *USGS Mineral Commodity Summaries, 2014*
4. *www.worldsteel.org*

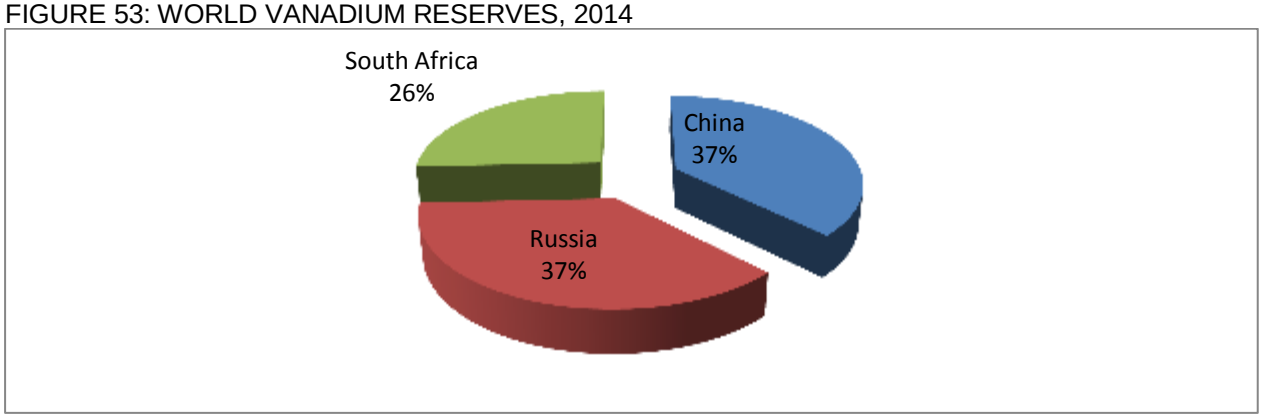
VANADIUM

M Khaile

SUPPLY AND DEMAND

World vanadium resources and reserves are estimated at 63 million metric tons (Mt) and 14 Mt), respectively. China and Russia account for 37 percent each, while South Africa is host to 26 percent of the world's vanadium reserves (Figure 53). Vanadium is used as an input in the production of titanium alloys for aerospace and industrial purposes in the form of ferrovanadium. It is preferred for its properties of corrosion resistance and structural strength, and used to produce high strength low alloy (HSLA) steels. In 2014, non-ferrous alloys accounted for about 4.5 percent of vanadium consumption while only 1 percent of vanadium consumed was used in energy storage applications.

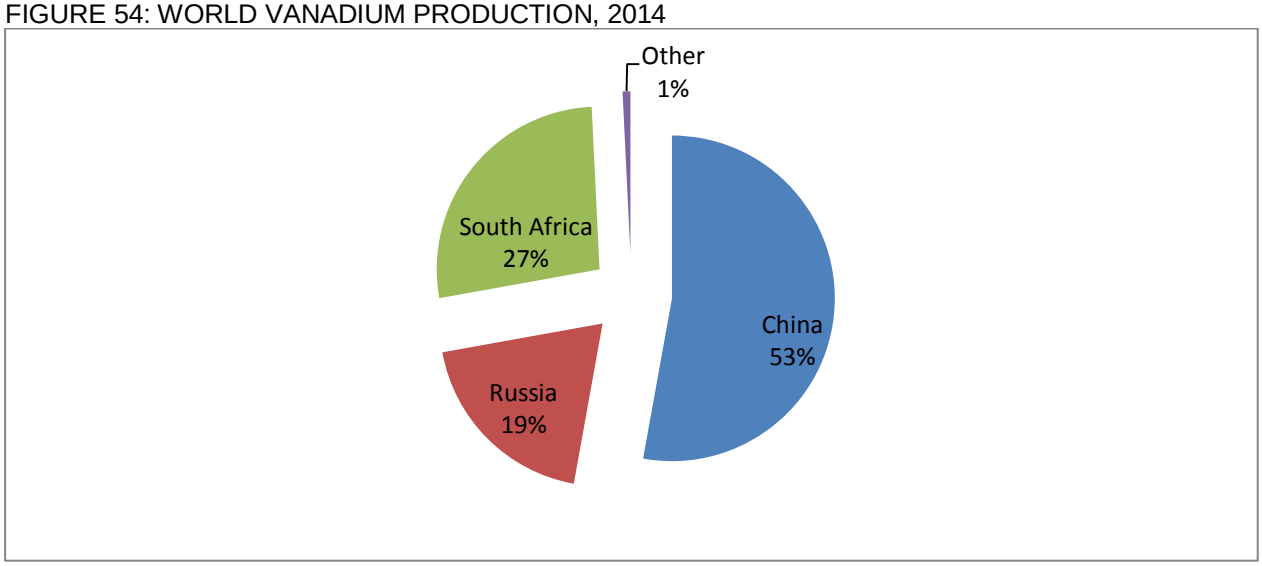
FIGURE 53: WORLD VANADIUM RESERVES, 2014



Source: USGS, Mineral Commodity Summaries

Global vanadium output stood at 77.6 kt in 2014, a 2.1 percent increase when compared with 2013. China contributed 53 percent to world vanadium output, followed by South Africa and Russia at 27 and 19 percent, respectively (Figure 54).

FIGURE 54: WORLD VANADIUM PRODUCTION, 2014



Source: USGS Mineral Commodity Summaries

South Africa's vanadium production increased by a minimal 0.9 percent to 21.5 kt in 2014 when compared with 2013 (Table 81). Vanadium local sales mass remained stagnant between 2013 and 2014 at 2 kt, while export mass declined by 9.9 percent year on year due to timid demand from the steel industry. World steel output was lower by 0.7 percent at 1 637 Mt in 2014, compared with 2013, an indication of weakening demand.

TABLE 81: SOUTH AFRICA'S PRODUCTION AND SALES OF VANADIUM, 2005 – 2014

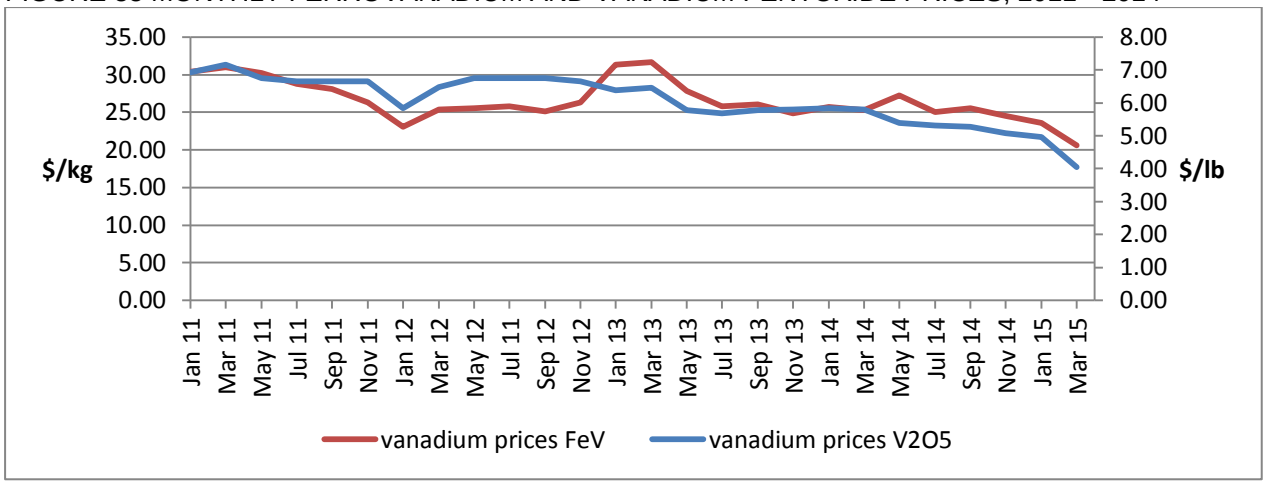
YEAR	PRODUCTION	LOCAL SALES			EXPORT SALES		
		Mass	Value (FOB)		Mass	Value (FOB)	
	kt	kt	R'mil	R/kg	kt	R'000	R/kg
2005	22.6	2.8	1 154	406	15.3	3 758	246
2006	23.8	2.0	452	222	15.6	2 653	170
2007	23.5	2.3	446	191	14.3	2 319	163
2008	20.3	2.3	893	391	12.1	3 090	256
2009	14.4	1.8	267	149	11.9	1 360	116
2010	22.6	1.9	286	152	16.9	2 182	129
2011	21.7	1.7	270	155	17.9	2 288	128
2012	20.0	1.4	211	148	15.5	2 279	147
2013	21.3	2.0	349	147	15.1	2 637	175
2014	21.5	2.0	381	187	13.6	3 174	232

Source: DMR, Mineral Economics

PRICES AND REVENUE

Ferrovanadium (FeV) and vanadium pentoxide (V_2O_5) prices started to move in the same direction from the third quarter of 2013, after FeV prices rose above the $30/kg mark in the first quarter of 2013. FeV and V_2O_5 prices averaged $5.81/lb and $25.45/kg during the first quarter of 2014, respectively, after which the FeV price fell to $24.52/kg in the fourth quarter of 2014. The 2014 FeV and V_2O_5 average annual prices dropped by a 2.9 percent and 7.9 percent when compared with 2013 (Figure 55), due to a weaker demand and an oversupplied market. According to Roskill, major Chinese producers are at the forefront of the oversupply on the global market, affecting prices and the profitability of smaller producers. Despite a decline in vanadium prices and export mass in 2014, total sales revenue increased by 19 percent y-o-y due to a weaker rand, which depreciated by 12.3 percent against the dollar to $1/R10.84 in the same period.

FIGURE 55 MONTHLY FERROVANADIUM AND VANADIUM PENTOXIDE PRICES, 2011 - 2014



Source: Metal Bulletin

EMPLOYMENT

Average annual employment in South Africa's vanadium industry increased slightly by 2.5 percent to 1 534 in 2014, (Table 82). Total remuneration increased by 8.2 percent in 2014 compared with 2013, resulting in a 6.1 percent increase in the average remuneration per employee.

TABLE 82: EMPLOYEMENT IN SOUTH AFRICA'S VANADIUM INDUSTRY, 2010-2013

YEAR	EMPLOYEES	TOTAL REMUNERATION	AVERAGE REMNERATION
		R' 000	R/employee
2009	1 313	377 193	287 276
2010	1 382	459 178	332 257
2011	1 436	520 683	326 593
2012	1 489	533 741	358 456
2013	1 496	585 744	391 540
2014	1 534	634 265	415 427

Source: DMR, Mineral Economics

KEY DEVELOPMENTS

The Ironveld pig iron vanadium project, which is expected to create over a thousand jobs, is located in the northern limb of the Bushveld Complex in Limpopo. The company has released its feasibility study assessing the economic viability of its pig iron and ferro-vanadium project. Ironveld expects to mine its own magnetite resource at approximately 2.4 Mt per annum. The study demonstrates the viability of developing the project, delivering 1 million tons per annum (Mt/a) of pig iron and 9.67 kt of FeV production from 2019, with the life of mine estimated at 25 years.

In September 2014 , Bushveld Minerals announced a resource upgrade for its vanadium project in Limpopo, increasing the mineral resource tonnage by 130 percent, most of which will be recovered from the hanging wall layers of the Main Magnetite Layer (MML). The project, which is estimated at US$236 million post tax, is expected to have its pre-feasibility study concluded in the final quarter of 2015.

OUTLOOK

According to Vanadium Corp, world vanadium production is expected to grow at a compound annual growth rate (CAGR) of 13.8 percent in the next five years to 2020, reaching the 90 kt mark. China is expected to lead the market reaching an estimated 65 kt by 2020. Global supply disruptions are expected to temporarily thwart the current oversupply, giving prices some respite in the short term. However, Roskill forecasts new mine supply, mainly from China, will have increased by an estimated 10 kt in 2020, driving prices even further down.

Construction sectors in the USA and China are expected to show growth rates of between 4.5 – 7.5 percent over the period 2016 to 2021, while the World Steel Association forecasts steel production to increase to 1 544.5 Mt and 1 565.5 Mt in 2015 and 2016, respectively. This could be very instrumental in growing South Africa's vanadium production and exports, and prove quite lucrative should prices recover.

REFERENCES

1. *DMR, Mineral Economics*
2. *Global Vanadium Consumption Market report, www.vanadiumsite.com*
3. *Roskill's Vanadium: Global Industry Markets and Outlook 2013 report, www.roskill.com*
4. *USGS Mineral Commodity Summaries Vanadium, 2014*
5. *World Steel Association, www.worldsteel.org*
6. *Mining Review, www.miningreview.com*
7. *Mining Weekly, www.miningweekly.com*

INDUSTRIAL MINERALS OVERVIEW

N Dlambulo and R Motsie

INTRODUCTION

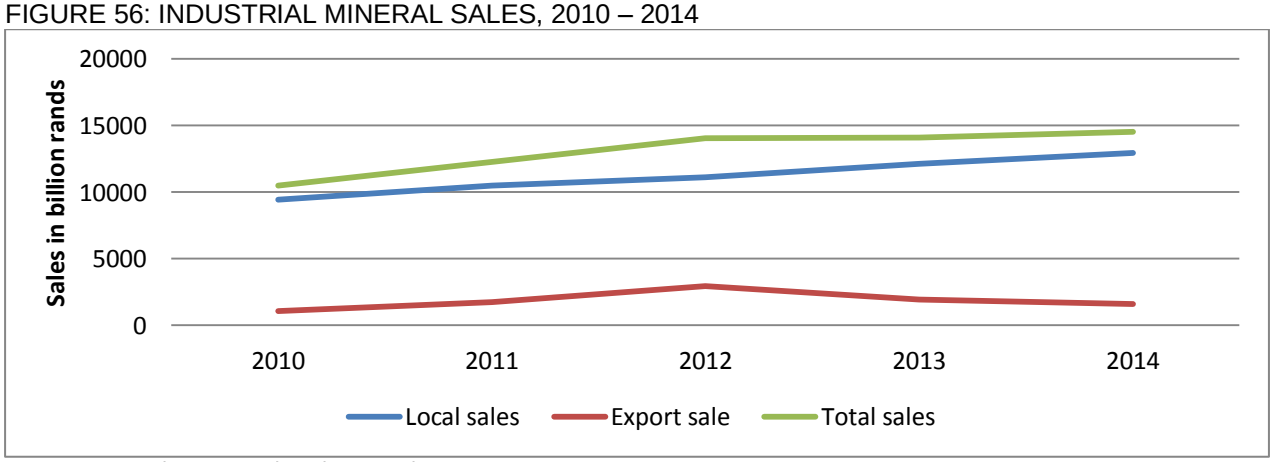
Industrial minerals are often referred to as the third world of the mining industry; comprise of a highly diverse group of vitally important minerals and rocks that are exploited for their non-metallurgical value. These are used in various applications, lime and limestone as well as phosphates in agriculture and fertiliser industries, sands, limestone and dimension stone in construction, fluorspar, and kaolin in pharmaceuticals and chemicals, andalusite, lime and silica sands in the metallurgical sector; kaolin and feldspar in the paint and pigment sectors. These account for the bulk of the local purchases. They are generally high volume, low value commodities compared with other minerals making their economic exploitation highly dependent on transport costs and distance to the market.

Most deposits appear near surface and are usually exploited through opencast mining methods rather than underground mining, presenting an opportunity for small-scale mining development. Many industrial minerals have a large value-added potential because the same mineral can often be used in different applications. Key to this sector is the performance of the mineral consuming market which drives the demand for industrial minerals. This is often led by the economic performance, population growth and development.

SALES TRENDS

Between 2010 and 2014, total sales of primary industrial minerals grew at a compound annual rate of 7.9 percent (Figure 56). Total revenue generated from industrial minerals sales in 2014 was R15.2 billion, accounting for 3.8 percent of total revenue contribution to mining. Local sales value increased by 8.3 percent to R13.1 billion while export sales surged by 15.8 percent to R2.2 billion (Table 84). Total sales increased by 8.6 percent in 2014 to R15.2 billion compared with R14 billion in 2013, owing to increased export sales of phosphate rock.

FIGURE 56: INDUSTRIAL MINERAL SALES, 2010 – 2014



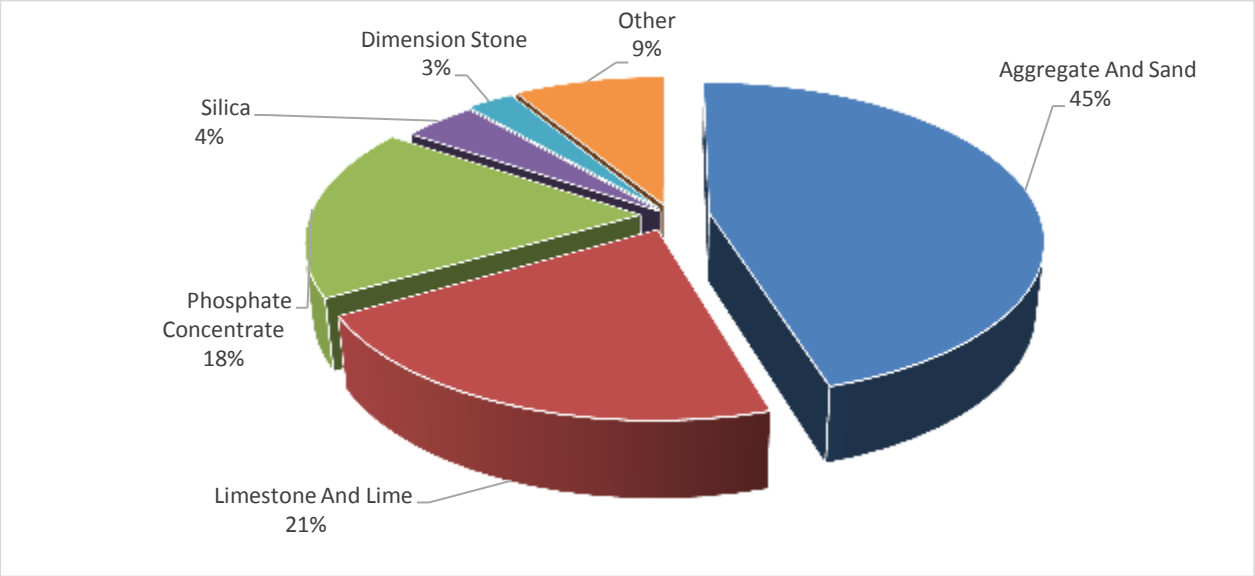
Source: DMR, Directorate Mineral Economics

DOMESTIC SALES

Consumption of industrial minerals is mostly driven by domestic demand from the construction and agricultural sectors (Figure 57). As most industrial minerals are low priced commodities and sold in large volumes, their economic exploitation is highly affected by transport costs and distance to markets. Hence, logistics account for a large share of the final delivered price of the mineral.

The value of industrial minerals sold locally, increased by 8.3 percent from R12.1 billion in 2013 to R13.1 billion in 2014 (Table 83 & 84), as a result of a rise in demand from the agricultural sector for fertilsers. Local sales growth, however, was offset by the stagnant growth in limestone sales to R2.79 billion as activity in the construction industry remained subdued.

FIGURE 57: LOCAL SALES VALUE OF INDUSTRIAL MINERALS, 2014

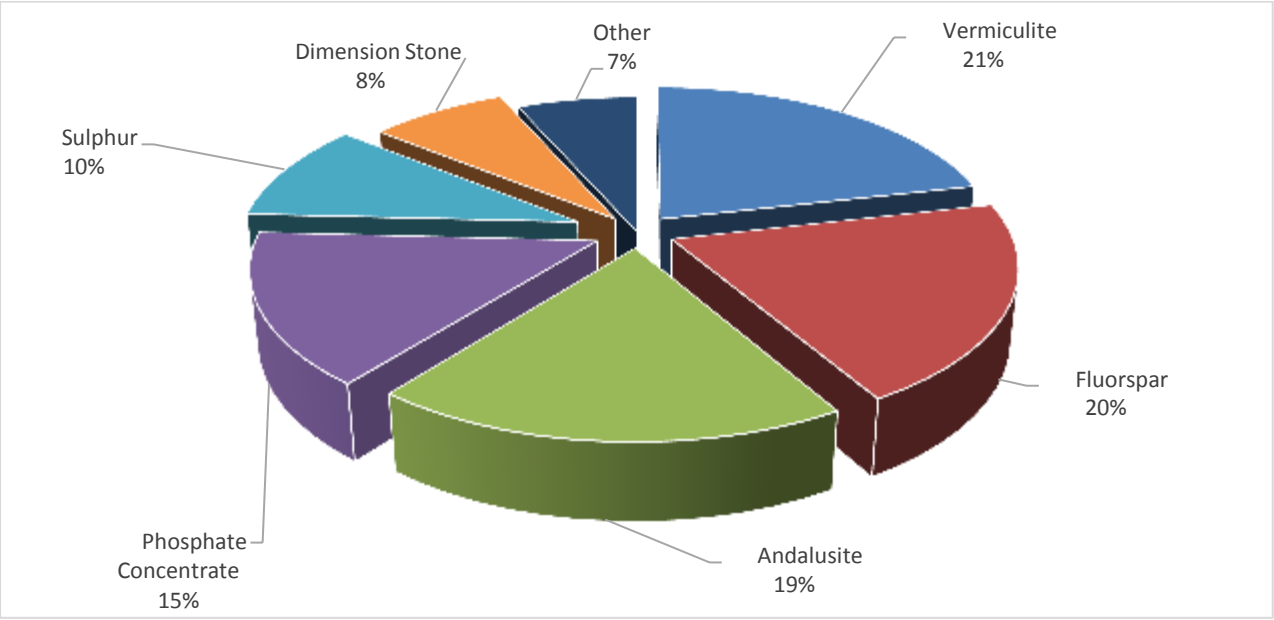


Source: DMR, Directorate Mineral Economics

EXPORT SALES

Export sales values of industrial minerals increased by 15.8 percent from R1.9 billion in 2013 to R2.2 billion in 2014. The biggest contributors to export sales of industrial minerals were vermiculite (21 percent), fluorspar (20 percent), andalusite (19 percent) and phosphate rock (15 percent) (Figure 58).

FIGURE 58: EXPORT SALES OF INDUSTRIAL MINERALS, 2014

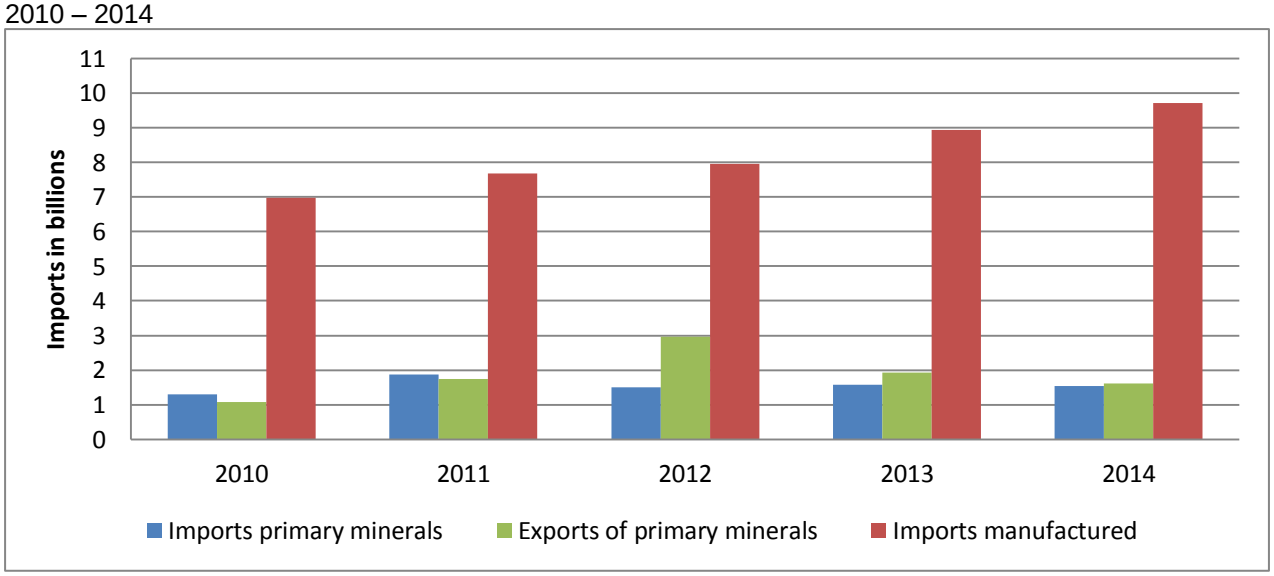


Source: DMR, Directorate Mineral Economics

IMPORTS

In 2014, expenditure on imports of primary industrial minerals declined by 3.2 percent to R1.53 billion compared with 2013, as a result of lower than expected growth in the economy (Table 85 and Figure 59). However, imports of manufactured industrial commodities increased by 8.7 percent to R9.7 billion in the same period owing to an increased demand for glazed ceramic products (Table 86).

FIGURE 59: IMPORTS AND EXPORTS OF PRIMARY AND MANUFACTURED INDUSTRIAL MINERALS, 2010 – 2014

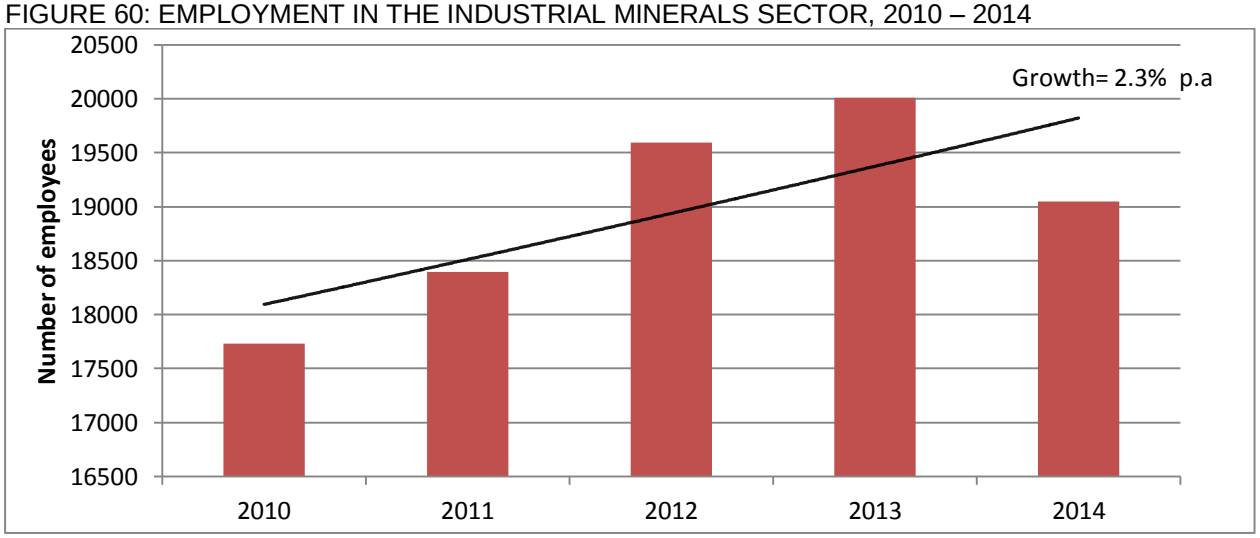


Source: RSA, Commissioner for South African Revenue Service, 2010 – 2014

EMPLOYMENT

Employment in the industrial minerals sector maintained a compound annual rate of 2.3 percent between 2010 and 2014 (Figure 60). The sector's employment decreased by 1.9 percent year-on-year, to 19 049 employees in 2014. This accounts for 3.8 percent of the total mining workforce, with average annual earnings per employee in 2014 of R155 113, a 5.1 percent increase from 2013. Revenue generated per employee increased by 11 percent as a result of increased production.

FIGURE 60: EMPLOYMENT IN THE INDUSTRIAL MINERALS SECTOR, 2010 – 2014



Source: DMR, Directorate Mineral Economics

OUTLOOK

Global economic activity remains subdued against a backdrop of economic uncertainty in the Euro-zone, the region's expected GDP growth of 1 percent in 2014, according to the *International Monetary Fund (IMF) has* a direct impact on the demand for South Africa's mineral commodities; due to South Africa's close financial and trading ties with Europe.

Although imports are essential for industrial growth, it is a concern that generally in this country a large percentage of mineral exports are made up of raw materials. Export destinations for most of South Africa's industrial minerals are Pacific Rim countries, such as China, Hong Kong, Japan. These countries are highly industrialised and rely heavily on the supply of industrial minerals from resource rich nations in Africa.

The industrial minerals sector presents the country with the opportunity to develop a strong and varied industrial base along with potential creation of a critical mass of small scale miners contributing to the creation of decent jobs as well as alleviating poverty. This is in line with the Governments' various industrial policies (Mineral Beneficiation Strategy, the NGP, NIPF/ IPAPII), with the National Development Plan lying at the centre of the all priorities of the South African Government.

Export sales values increased by 15.8 percent from R1.9 billion in 2013 to R2.2 billion in 2014, with significant exports of vermiculite (21 percent), fluorspar (20 percent) and andalusite (19 percent) being the largest contributors. South Africa enjoys ranking of some significance in these commodities. In the domestic market, the sales value of industrial minerals increased by 8.3 percent from R12.1 billion in 2013 to R13.1 billion in 2014. Total sales of primary industrial minerals have grown at a compound annual rate of 14 percent from 2010 to 2014 with the sector contributing 3.8 percent to total revenue generated from South Africa's primary mineral sales, with R13.1 billion coming from local sales and R2.2 billion from exports pointing out South Africa's important position in the world with respect to industrial minerals.

Infrastructure development lies at the centre of the South African government stimulatory fiscal package to drive growth over the next three years as it is a critical enabler for attracting investment and future economic competitiveness. Government plans to spend R827 billion over the next three years to build infrastructure, which will command demand for most industrial minerals.

Since growth in industrial minerals is mainly driven by the construction and agricultural sectors, the outlook is optimistic on the back of rising demand for fertilisers from the agricultural sector and expected improvement in activity in the construction sector suggesting a moderate pickup in building activity in the years ahead. Use of industrial minerals in the agricultural sector for fertiliser applications is expected to rise in the short to medium term on the back of a continuous increase in crop production to accommodate the growing population.

The slowdown in economic conditions has led to a decline in commodity prices, thus bringing down revenue projections of a lot of producers. However, there are signs of improving economic activity in some advanced and emerging economies that will spur demand for mineral commodities and result in a recovery in prices.

Planned large infrastructure investments programmes by government is expected to boost economic activity that will see a surge in demand for industrial minerals applications in the medium to long term, particularly in areas of construction and agriculture. Muted economic growth might be offset by government's plans to align budget priorities firmly with the National Development Plan, which will propel infrastructure development. The economy is expected to show future growth not only in its performance, but also in the amount of jobs created as the government has put long term measures in place to eliminate poverty and reduce inequality.

Industrial minerals are absolutely essential in the manufacturing of all kinds of products. Therefore, their use in a wide range of applications will support growth as they contribute to almost every sector of the economy. Thus, the future of the South African industrial minerals sector remains positive, since the sectors like manufacturing, refractories, glass, cement, construction, chemical and paint as well as the agricultural sector spur the local demand of these commodities supporting Government's localisation goals.

TABLE 83: SOUTH AFRICA'S PRIMARY INDUSTRIAL MINERAL PRODUCTION AND SALES, 2013

COMMODITY	PRODUCTION	LOCAL SALES (FOR)		EXPORT SALES (FOB)		TOTAL SALES	
	Mass (t)	Mass (t)	Value (R)	Mass (t)	Value (R)	Mass (t)	Value (R)
General							
Andalusite	**	**	**	**	**	**	**
Feldspar	191 443	186 535	101 444 059	0	0	186 535	101 444 059
Fluorspar	157 776	16 336	**	158 046	**	174 382	**
Gypsum	559 443	327 275	58 287 993	0	0	327 275	58 287 993
Kieselguhr	144	143	218 516	0	0	143	218 516
Magnesite	**	**	**	**	**	**	**
Mica	309	113	835 245	0	0	113	835 245
Mineral Abrasives	0	0	0	0	0	0	0
Perlite	**	**	**	**	**	**	**
Phosphate Rock	2 131 854	1 634 067	**	170 926	**	1 804 993	**
Pyrophyllite	**	**	5 687 405	**	4 943 667	**	10 631 072
Silica	2 296 210	2 442 301	461 182 648	9 914	26 213 131	2 452 215	487 395 779
Sulphur	270 173	132 532	67 127 100	140 626	231 605 529	273 158	298 732 629
Talc	4 924	7 117	8 806 136	0	0	7 117	8 806 136
Vermiculite	127 658	8 553	17 861 177	118 348	380 489 796	126 901	398 350 973
Salt	477 038	478 331	155 252 845	0	0	478 331	155 252 845
Clays							
Attapulgite	21 233	15 395	8 417 524	0	0	15 395	8 417 524
Bentonite	177 187	169 596	123 077 269	80	139 951	169 676	123 217 220
Fireclay	506 019	514 914	18 732 223	0	0	514 914	18 732 223
Flintclay	22 984	20 978	31 946 724	1 286	4 041 978	22 264	35 988 702
Plastic Clay	1 328	2 157	412 983	0	0	2 157	412 983
Kaolin	22 295	35 222	16 740 341	0	0	35 222	16 740 341
Limestone And Lime	21 965 622	20 096 700	2 804 478 612	58 556	20 539 017	20 155 256	2 825 017 629
Dimension Stone							
Granite	0	236 231	329 072 450	75 164	135 476 798	311 395	464 549 248
Marble	0	0	0	0	0	0	0
Sandstone	0	563	1 223 791	0	0	563	1 223 791
Slate	0	19 266	8 390 497	0	0	19 266	8 390 497
Aggregate And Sand	0	60 374 535	5 250 636 061	0	0	60 374 535	5 250 636 061
Miscellaneous			2 590 782 295		1 124 654 741		3 715 437 036
TOTALS			12 060 613 894		1 928 104 608		13 988 718 502

Source: *DMR, Directorate Mineral Economics*
Notes: *All quantities are in metric tons, unless otherwise specified*
***Classified, included under Miscellaneous*

TABLE 84: SOUTH AFRICA'S PRIMARY INDUSTRIAL MINERAL PRODUCTION AND SALES, 2014

COMMODITY	PRODUCTION	LOCAL SALES (FOR)		EXPORT SALES (FOB)		TOTAL SALES	
	Mass (t)	Mass (t)	Value (R)	Mass (t)	Value (R)	Mass (t)	Value (R)
General							
Andalusite	**	**	**	**	**	**	**
Feldspar	102 541	99 856	52 134 309	0	0	99 856	52 134 309
Fluorspar	164 054	13 856	**	130 772	**	144 628	**
Gypsum	376 223	290 222	52 580 075	0	0	290 222	52 580 075
Kieselguhr	0	0	0	0	0	0	0
Magnesite	**	**	**	**	**	**	**
Mica	83	0	0	0	0	0	0
Mineral Abrasives	147 010	1 607	205 853	46 171	54 010 701	47 778	54 216 554
Perlite	**	**	**	**	**	**	**
Phosphate Concentrate	2 011 151	1 639 262	**	227 347	**	1 866 609	**
Pyrophyllite	**	**	4 909 662	**	18 447 774	**	23 357 436
Silica	2 586 547	2 621 297	548 007 558	15 959	46 794 973	2 637 256	594 802 531
Sulphur	277 018	156 408	132 463 146	128 460	213 741 891	284 868	346 205 037
Talc	4 827	5 606	8 296 610	0	0	5 606	8 296 610
Vermiculite	143 007	9 261	19 027 542	144 372	461 928 778	153 633	480 956 320
Salt	493 828	492 482	160 695 415	0	0	492 482	160 695 415
Clays							
Attapulgite	18 376	18 375	9 223 568	0	0	18 375	9 223 568
Bentonite	169 591	126 409	62 131 025	0	0	126 409	62 131 025
Fireclay	239 906	232 812	16 233 699	0	0	232 812	16 233 699
Flintclay	26 891	27 172	37 981 321	1 853	6 446 597	29 025	44 427 918
Plastic Clay	268	1 541	457 158	0	0	1 541	457 158
Kaolin	27 258	21 940	12 971 964	0	0	21 940	12 971 964
Limestone And Lime	21 776 096	19 340 132	2 785 855 055	44 872	16 795 266	19 385 004	2 802 650 321
Dimension Stone							
Granite		135 584	347 872 503	78 328	164 769 306	213 912	512 641 809
Marble		0	0	0	0	0	0
Sandstone		352	739 585	0	0	352	739 585
Slate		19 051	9 350 440	0	0	19 051	9 350 440
Aggregate And Sand		62 157 526	5 929 249 912	0	0	62 157 526	5 929 249 912
Miscellaneous			2 883 708 426		1 173 332 339		4 057 040 765
TOTALS			13 074 094 826		2 156 267 625		15 230 362 451

Source: *DMR, Directorate Mineral Economics*
Notes: *All quantities are in metric tons, unless otherwise specified*
***Classified, included under Miscellaneous*

TABLE 85: SOUTH AFRICA'S IMPORTS OF SELECTED PRIMARY INDUSTRIAL MINERAL COMMODITIES, 2012 – 2014

COMMODITY	2012		2013		2014	
	Mass (t)	Value (R)	Mass (t)	Value (R)	Mass (t)	Value (R)
Salt (25.01)	4 383	16 241 265	527 893	193 964 262	58 250	35 235 429
Iron pyrites (25.02)	409	1 169 195	462	1 276 140	294	1 886 021
Sulphur (25.03)	506 072	843 455 975	489 092	530 362 328	537 477	866 566 120
Graphite Natural (25.04)	768	10 371 894	704	8 389 823	603	9 207 884
Sands (25.05)	6 615	14 594 027	7 329	17 085 535	7 190	15 869 825
Quartz (25.06)	161	500 291	446	3 445 548	1 185	6 483 631
Kaolin (25.07)	17 832	46 389 642	14 761	47 482 294	14 835	55 596 793
Bentonite (25.08.10)	42 834	59 402 857	37 680	68 794 998	71 704	97 752 752
Fire clay (25.08.30)	288	1 017 866	955	3 419 825	1 016	4 982 690
Other clays (25.08.40)	6 204	25 266 115	6 400	24 515 379	3 244	16 609 702
Alumino silicates (25.08.50)	240	627 976	359	956 749	298	1 119 716
Mulite (25.08.60)	113	823 500	200	1 717 575	60	891 655
Chamotte (25.08.70)	80	562 947	87	278 151	1	39 660
Chalk (25.09)	3 794	4 997 543	2 950	5 603 112	1 487	3 807 606
Phosphates (25.10)	265	1 321 463	9 778	10 087 752	170	829 224
Barrytes & Witherite (25.11)	2 962	11 468 513	3 128	10 194 800	5 699	18 804 051
Kieselguhr (25.12)	5 217	19 969 935	4 016	18 939 815	4 541	26 418 671
Natural Abresives (25.13)	2 251	7 152 239	2 088	8 239 185	996	5 397 581
Slate (25.14)	1 970	8 062 338	3 376	12 187 002	1 792	7 259 716
Marble (25.15)	226	2 465 778	8 160	9 268 421	8 056	12 852 807
Granite (25.16)	5 977	13 549 218	35 165	53 979 936	41 519	63 482 642
Pebbels (25.17)	1 860	3 729 155	37 208	20 708 123	49 455	26 896 985
Dolomite (25.18)	1 255	3 949 369	7 116	6 449 717	5 026	8 600 314
Magnesite & Magnesia (25.19)	61 922	207 573 638	76 472	267 322 588	56 042	264 498 878
Gypsum & Plasters (25.20)	18 754	23 991 411	12 375	31 706 268	73 858	47 189 967
Limestone (25.21)	3 919	1 527 948	9	185 370	96	71 520
Slaked,quick, hydraulic lime (25.22)	34 801	64 415 926	32 623	70 710 718	31 080	60 644 387
Asbestos (25.24)	0	0	47	8 376	27	8 275
Mica (25.25)	425	1 353 366	663	2 997 339	862	3 853 088
Steatite (25.26)	7 696	27 556 285	8 182	33 407 817	9 096	43 499 970
Borates Natural (25.28)	1 157	4 360 705	611	3 022 801	1 772	8 305 824
Feldspathoids (25.29)	10 415	20 998 959	8 217	19 999 601	7 694	17 749 074
Other Minerals (25.30)	55 704	61 649 676	52 473	98 154 185	54 274	113 981 924
TOTAL		**1 509 315 576**		**1 584 861 533**		**1 846 394 382**

Source: *RSA, Commissioner for South African Revenue Service, 2012 – 2014*
Note: *Codes in brackets refer to subchapters of the Harmonised System*

TABLE 86: SOUTH AFRICA'S IMPORTS OF MANUFACTURED INDUSTRIAL MINERALS COMMODITIES, 2012 – 2014

Commodity	2012 Value (FOB) R	2013 Value (FOB) R	2014 Value (FOB) R
Articles of stone, plaster, cement, asbestos, mica or similar materials	**1 396 402 431**	**1 597 381 694**	**1 819 033 707**
Building stone (68.02)	338 271 668	321 331 515	361 787 425
Worked slate & articles of slate (68.03)	18 924 065	21 562 582	32 432 869
Millstones and grindstones (68.04)	164 570 865	208 879 780	197 725 886
Natural abrasive powders (68.05)	228 800 898	265 927 592	329 248 637
Slag wool, rock wool & similar mineral wools (68.06)	462 855 480	570 278 282	657 436 715
Articles of asbestos-cement (68.11)	49 830 085	51 090 138	72 606 234
Fabricated asbestos fibres (68.12)	3 260 126	9 818 302	3 987 022
Friction material (68.13)	111 374 572	129 805 188	152 665 566
Worked mica & articles thereof (68.14)	18 514 672	18 688 315	11 143 353
Refractories	**1095334542**	**1103337528**	**826521846**
Of siliceous fossil meals (69.01)	4 427 437	9 762 955	23 945 674
Other bricks (69.02)	948 032 067	920 252 714	600 903 761
Other refractory ceramic goods (69.03)	142 875 038	173 321 859	201 672 411
Ceramic products	**3235329552**	**3661461734**	**4 198 867 983**
Ceramic building bricks (69.04)	4 383 427	5 413 245	2 456 096
Roofing tiles (69.05)	11 341 669	14 795 951	9 415 368
Ceramic pipes (69.06)	3 315 428	3 403 989	796 058
Unglazed ceramic (69.07)	174 159 631	218 139 646	243 601 692
Glazed ceramic (69.08)	971 850 060	1 274 022 100	1 340 960 746
Ceramic wares for laboratory (69.09)	1 410 269 648	1 353 877 120	1 798 941 993
Ceramic sinks (69.10)	131 150 472	177 635 887	202 829 922
Tableware (69.11)	233 092 270	269 793 924	260 370 104
Ceramic tableware (69.12)	219 973 468	256 045 532	253 064 170
Ceramic articles (69.13)	59 448 361	72 703 674	63 701 680
Other ceramic articles (69.14)	16 345 118	15 630 666	22 730 154
Glass and glassware (70.00)	**2 218 794 980**	**2 569 511 317**	**2866867242**
TOTAL	**7 945 861 505**	**8 931 692 273**	**9 711 290 778**

Source: *RSA, Commissioner for South African Revenue Service, 2012 – 2014*
Note: *Codes in brackets refer to subchapters of the Harmonised System*

AGGREGATE AND SAND

M. Singo and R. Motsie

SUPPLY AND DEMAND

Local sales mass of sand and aggregate increased by 4.5 percent from 62.2 Mt in 2014 to 65.0 Mt in 2015, as a result of more workloads from larger infrastructural projects. Consequently, local sales value also increased by 11.7 percent from R5.9 billion in 2014 to R6.6 billion in 2015, due to a higher unit value which rose by 6.8 percent from 95.4 R/t to 101.9 R/t. (Table 87).

TABLE 87: SOUTH AFRICA'S SALES OF SAND AND AGGREGATE BY MASS, 2005 -2015

YEAR	COARSE			FINE			Total sales		
	Mass kt	Value (FOR) R'000	R/t	Mass kt	Value (FOR) R'000	R/t	Mass kt	Value (FOR) R'000	R/t
2005	37 923	2 000 985	52.8	12 046	221 034	18.3	49 970	2 222 019	44.5
2006	47 144	2 549 709	54.1	11 419	239 846	21.0	58 563	2 789 555	48.0
2007	50 678	3 077 423	60.7	13 143	298 941	22.7	63 821	3 376 364	52.9
2008	45 218	3 358 639	74.3	13 391	416 364	31.1	58 609	3 775 003	64.4
2009	41 182	3 491 901	84.8	12 422	403 784	32.5	53 604	3 895 685	72.7
2010	39 078	3 419 386	87.5	13 279	457 693	34.5	52 357	3 877 079	74.1
2011	38 203	3 570 160	89.0	13 392	492 323	37.0	51 595	4 062 483	79.0
2012	40 009	3 948 031	98.7	13 365	528 329	40.0	53 374	4 476 359	84.0
2013	46 553	4 710 248	101.2	14 861	616 553	41.5	61 414	5 326 801	86.7
2014	48 124	5 332 814	110.8	14 033	596 436	42.5	62 158	5 929 250	95.4
2015	49 995	5 938 091	118.8	14 956	685 426	45.8	64 951	6 623 518	101.9

Source: DMR, Directorate Mineral Economics
Notes: +Includes Crusher Sand
xNatural Sand

The market for sand and aggregate is derived from the primary building and construction activity, which constituted 64.9 Mt of sales consumption in 2015. Demand for aggregate and sand improved on the back of road upgrades projects and development of new houses driven by the implementation of the national infrastructure programme.

KEY DEVELOPMENTS

In 2015, Afrimat purchased Cape lime, including both Vredendal and Robertson operations that had a remaining resource life of more than 30 years for R276 million in cash and shares. The acquisition is the largest Afrimat has made to date is an expansion of their diversification strategy directed at leveraging off the company's core business to offer new products in existing markets. Cape lime is well known for providing exceptional quality mineral products, such as dolomitic aggregate, dolomitic agricultural lime, white lime, etc. The purchase will complement and expand Afrimat's industrial minerals product. The company also acquired WG Wearne in the third quarter of 2016 for R30 million through its subsidiary, Rodag Holdings, as part of increasing its market share in rural geographic locations. The quarry is located in Bethlehem, Free State and, it produces very high quality aggregates.
Eastern Cape Development (ECDC) unveiled a R200 million quarry aggregate mine in the second quarter of 2016 with estimated lifespan of 30 years. The quarry is situated in Indwe which is 120 km outside Queenstown in the Eastern Cape. The quarry has provided some relief to the high unemployment rates in the area and it employs 40 permanent staff from the surrounding communities. The quarry has secured two off-take agreements already and is in negotiation with the local municipality to supply material for 1 500 RDP houses and several companies in road construction.

B & E International is establishing a larger quarry on the footprint of what was previously the Howard quarry to secure dolerite rock to make sure that quality aggregates are still available for customers in that area. The quarry is situated south of the N4 between the Balmoral and Highveld steel off ramps in Mpumalanga province. And it has an envisaged life span of 25 years. The hard rock dolerite has been proven to be superior to any rock type found in that region. The new quarry is predicted to meet the

growing demand for superior quality road building aggregates in Mpumalanga coalfields region. It will produce aggregate requirements for road building across the spectrum including sub base, G2, G1, all concrete aggregates, full range of seal and asphalt aggregated, railway ballast, gabion and dump rock aggregates and crusher sands in a minus 7 and a minus 475 (super sand).

CONSTRUCTION

The South African construction industry managed a positive growth of 4.6 percent y-o-y despite the weak performance experienced in the third quarter of 2015 due to labour unrest which delayed some of the country's significant projects. The construction industry is made up of civil construction, residential building and non-residential building. According to 2015 revised estimates that were issued by Statistics South Africa (StatsSA), R75 billion was spent on housing, R71 billion on non-residential building and close to R250 billion on construction works. Consequently, construction works had a positive growth of about 7 percent y-o-y in 2015, on the back of investment in renewable energy projects

The nominal value of civil contracts awarded increased by 4 percent y-o-y in the first quarter of 2016, after a 10 percent y-o-y increase that was reported in 2015. However, the number of civil projects fell by 8 percent y-o-y in the first quarter of 2016. Although there was a decline in the first quarter, the first two months of the second quarter of 2016 has shown a more robust increase of 26 percent y-o-y compared to the same period in 2015. There was some improvement in the estimated value of construction tenders published during the first quarter of 2016, which increased by 32.9 percent y-o-y compared to the first quarter of 2015, following a nominal decrease of 5.6 percent y-o-y during 2015. Turnover is estimated to have increased by between 10 and 15 percent in real terms boosted by awarding of few higher value projects. The estimated value of tenders has since increased during the first quarter of 2016 by 32 percent, supported by an increase of 85 percent in the value of road projects out to tender, while estimated value of water projects were down by 10 percent.

PRICES AND REVENUE

Both unit values for aggregate and sand increased by 7.2 percent and 7.8 percent respectively, to 118.8 R/t in 2015 for aggregate and 45.8 R/t in 2015 for sand (Table 87). Aggregate sales value improved on the back of favorable prices which resulted in an 11.7 percent rise in revenue of R6.6 billion. Sales value for sand also increased by 14.9 percent to R685 million. The increase in sales for sand and aggregate was as a result of an increase of 6.6 percent and 3.9 percent respectively of volumes that were traded.

EMPLOYMENT

Employment in the sand and aggregate sector decreased by 4.7 percent from 7 894 employees in 2014 to 7 526 employees in 2015 (Table 88). Labour productivity increased by 9.6 percent from 7.9 kt per employee in 2014 to 8.6 kt per employee in 2015. Revenue generated per employee increased by 17.2 percent to R 880 085/employee. Average annual earnings increased by 9.6 percent from R135 734 per employee in 2014 to R148 788 per employee in 2015.

TABLE 88: SOUTH AFRICA'S AGGREGATE AND SAND QUARRIES EMPLOYMENT AND REMUNERATIONS

YEAR	EMPLOYEES	TOTAL REMUNERATION
		R'000
2010	7 009	693 767
2011	7 123	746 991
2012	7 544	870 694
2013	7 579	941 425
2014	7 894	1 071 486
2015	7 526	1 119 776

Source: DMR, Directorate Mineral Economics

OUTLOOK

Government's infrastructure development programme is set to continue driving the demand for raw materials like aggregates and sand in the construction sector in the medium term. This growth will be underpinned by expansion in public works programmes coupled with energy and transport infrastructure projects, as set out in the National Transport Master Plan. There is a huge drive to develop the country's rail network and ports infrastructure in a bid to improve the ease of doing business in South Africa and thus increase the level of investment.

The National Transport Master Plan underscored by the National Infrastructure Plan (NIP) aims to invest R751 billion on infrastructure projects until 2050, where 43 percent of this investment will go to the rail segment which is projected to grow to about 350 Mt from 200 Mt by 2020 as a result of increased market demand. Urbanization will also drive a large portion of construction growth in the next decade, which will lead to increase in demand for aggregates and sand for housing projects on the back of government's plans to build 1.5 million units by 2019.

REFERENCES

1. *ASPASA Annual report 2014/15*
2. *DMR, Directorate Mineral Economics*
3. *http://www.fin24.com,article:construction transformation only window dressing 2016.*
4. *http;//www.engineeringnews.co.za.*
5. *SAFCEC Annual report 2014/2015*
6. *State of the South African Civil Engineering Contracting Industry, 1st and 2nd Quarter 2016, 3rd Quarter 2015.*
7. *www.pwc.co.za/construction,Highlighting trends in the South African construction industry, 3rd edition, November 2015.*

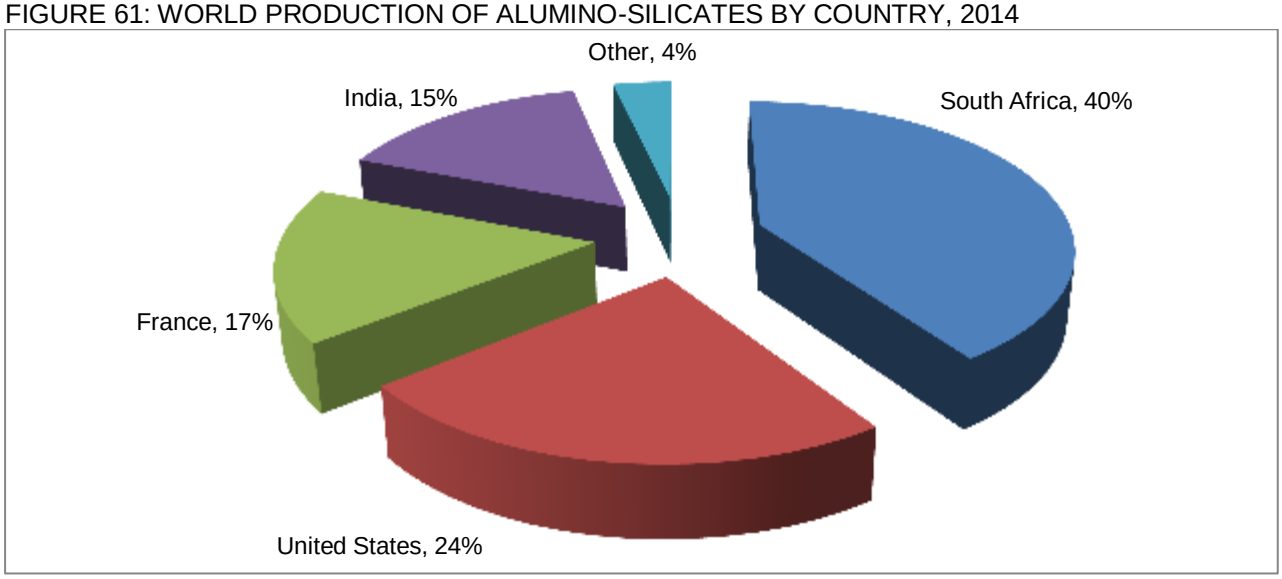
ALUMINO-SILICATES

M Modiselle

SUPPLY AND DEMAND

World production of the alumino-silicate minerals decreased by 9.5 percent to 420 kt in 2014 compared with 435 kt in 2013, due to the slowdown in the global steel production. Over the past 25 years, production of andalusite and its products has mainly been focused in South Africa and Europe. Global andalusite supply is mainly dominated by South Africa at 40 percent, followed by the United States (US) at 24 percent, France's 17 percent and India's 15 percent (Figure 61).

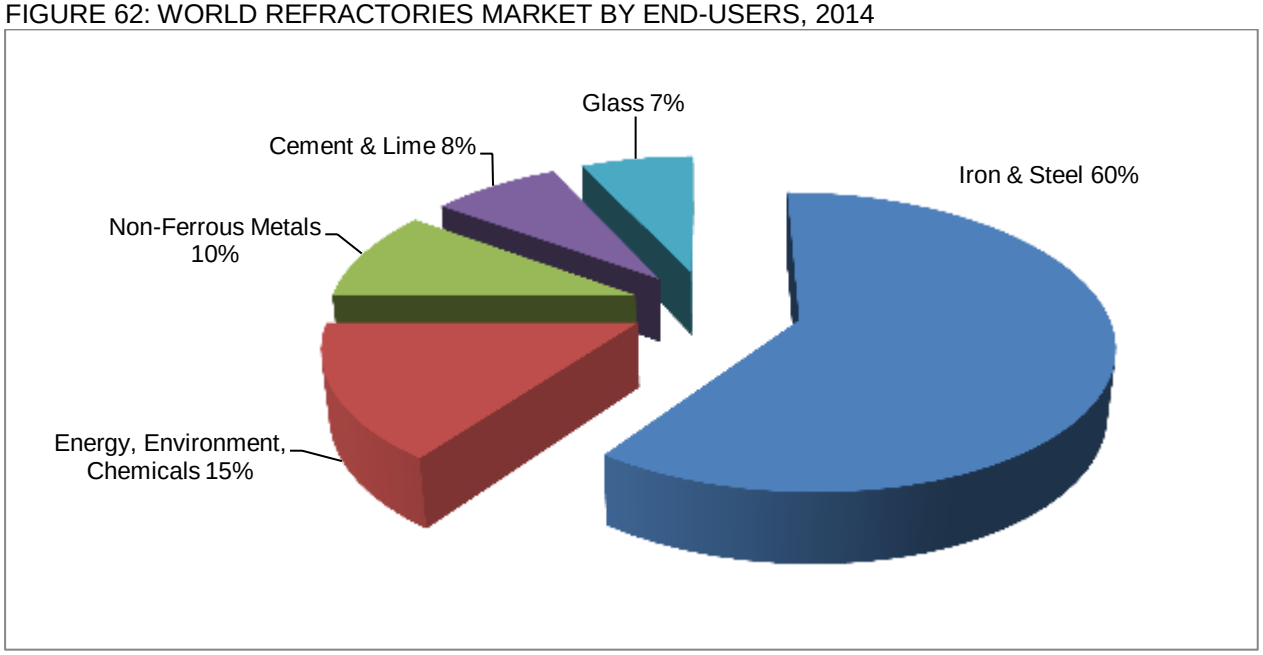
FIGURE 61: WORLD PRODUCTION OF ALUMINO-SILICATES BY COUNTRY, 2014



Sources: USGS, 2015

Around 60-70 percent of the world's refractories are used in iron and steel making, while the rest are mostly consumed in the manufacturing of energy, environment and chemicals (EEC), cement, glass and non-ferrous metals (Figure 62). Since andalusite is largely used in the steel industry, any recovery in the market is closely tied to steel consumption, and 2014, was expected to be more bullish compared to output in 2013. Data from the World Steel Association, however, suggests that production was relatively flat over the year, although some recovery was noted in emerging economies. In the second half of 2013 the market environment was characterised by an aggressive export strategy by Chinese producers as a result of a weak domestic market and excess domestic capacity. This led to high pressure on steel prices and consequently, the increased profitability of manufacturers and suppliers. In many markets, anti-dumping duties are intensively discussed as a response to the massively growing Chinese imports, and in some cases these have already been introduced (including wine and solar panels).

FIGURE 62: WORLD REFRACTORIES MARKET BY END-USERS, 2014



Source: RHI AG, August 2015

Imerys' subsidiary, Denain-Anzin Mineraux Refractarie Ceramique (Damrec), is the world's largest supplier of andalusite and produced 70 percent of the total output from South Africa. Damrec operates in the region with two subsidiaries, Rhino Minerals Ltd, which controls the Annesley and Rhino mines in the Limpopo Province, and South African Mineral Resource Committee Ltd (Samrec), which operates Krugerpost mine in Mpumalanga Province. Imerys also manages a China-based subsidiary, Yilong Andalusite, which accounts for around 18 percent of global supply. This means that Imerys controls approximately 67 percent of the global market, while second place, Andalusite Resources controls 15 percent.

South Africa's production of andalusite decreased in 2014. Limpopo experienced heavy rainfall in 2014, which impacted andalusite supply out of the region. Producers suffered flooding to pits and damage to infrastructure, causing significant disruption in the supply chain. Krugerpost mine was mothballed to have a more balanced production capacity and there were plant upgrades to increase output and quality. Local sales decreased in 2014 owing to lower production. South Africa's exports of andalusite increased in 2014, despite a fall in production, due to the slight recovery from emerging economies of the Asia Pacific, especially China and India. Data of production, local and export sales are withheld from 2011 due to confidentiality reasons as shown (Table 89).

TABLE 89: SOUTH AFRICA'S PRODUCTION, LOCAL SALES AND EXPORTS OF ANDALUSITE, 2005–2014

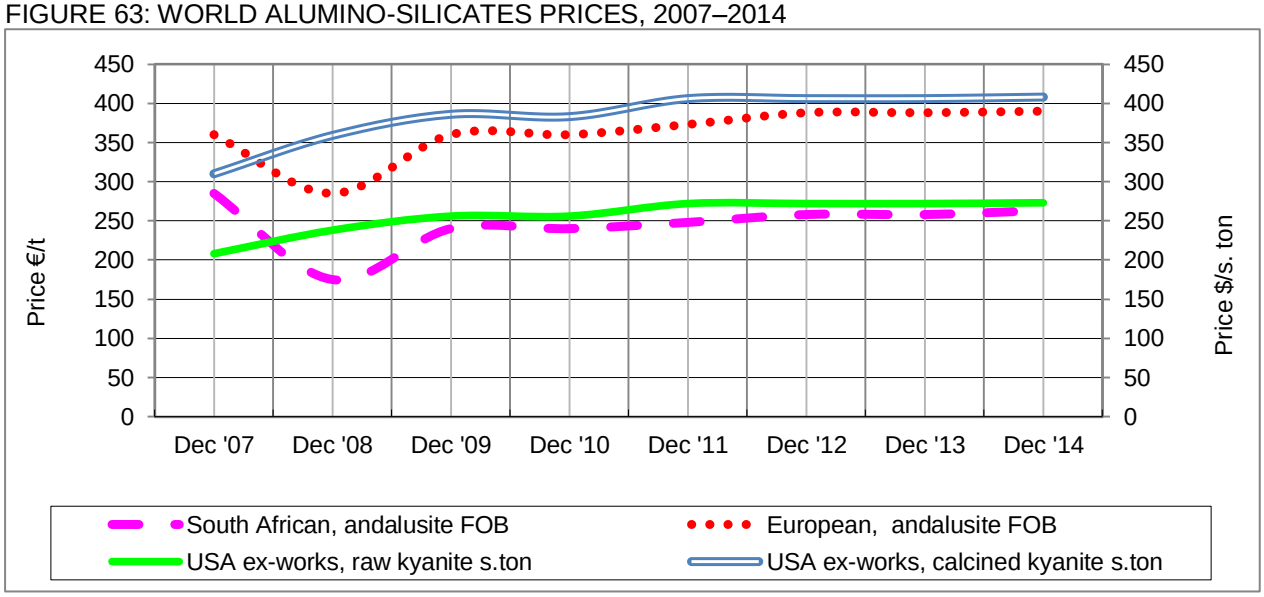
		LOCAL SALES			EXPORTS		
YEAR	PRODUCTION	Mass	Value (FOR)		Mass	Value (FOB)	
	Kt	kt	R'000	R/t	Kt	R'000	R/t
2005	228	47	57 568	1 236	135	186 229	1 380
2006	221	47	59 022	1 249	129	183 581	1 421
2007	265	51	70 554	1 382	175	282 164	1 612
2008	217	75	115 292	1 534	148	289 175	1 954
2009	165	53	97 918	1 855	109	253 554	2 326
2010	189	92	167 667	1 829	134	321 933	2 406
2011	*	*	*	*	*	*	*
2012	*	*	*	*	*	*	*
2013	*	*	*	*	*	*	*
2014	*	*	*	*	*	*	*

Source: DMR, Mineral Economics
*Note: *Data withheld for reasons of confidentiality*

PRICES AND REVENUES

Andalusite, kyanite and sillimanite are alumino-silicate minerals, with high Al_2O_3 content varying from 63 percent (high-grade) to below 40 percent (low-grade), and silica content of about 37 percent. The South African market prices (2 000 tonne bulk, FOB) for 57-58 percent aluminium trioxide (Al_2O_3) andalusite concentrate were in the range of €235-€290/t in 2014 up from €235-€280/t in 2013 (Figure 63). The European FOB prices for 55-59 percent Al_2O_3 were in the range of €355-€425/t in 2014 up from €350-425/t in 2013. The US prices for raw and calcined 55-60 percent Al_2O_3 kyanite were in the range of $225-$320/t and $375-$440/t in 2014, respectively.

FIGURE 63: WORLD ALUMINO-SILICATES PRICES, 2007–2014



Source: Industrial Minerals, 2014

Export sales revenues increased by over 10 percent as a result of slight recovery from emerging economies.

EMPLOYMENT

Employment in the alumino-silicate industry decreased by 12.3 percent to 349 employees in 2014 compared with 398 employees in 2013 (Table 90) owing to the drop in employment as the companies conducted internal re-structuring.

TABLE 90: SOUTH AFRICA'S ALUMINO-SILICATE MINES: EMPLOYMENT, 2006–2014

YEAR	EMPLOYEES	TOTAL REMUNERATION R'000
2006	501	38 776
2007	567	48 581
2008	742	62 956
2009	765	68 471
2010	472	65 953
2011	429	*
2012	392	*
2013	398	*
2014	349	*

Source: DMR, Mineral Economics

**Total Remuneration figures withheld for reasons of confidentiality*

KEY DEVELOPMENTS

Imerys proposed a takeover of South Africa's Andalusite Resources. Following an investigation by the Competition Commission (CompCom), the authority concluded that as the only two miners and suppliers of andalusite in South Africa, a merger between Imerys and Andalusite Resources would negatively impact customers globally. CompCom blocked the transaction as it would have removed an effective competitor in

the fine and medium grade andalusite market. Meanwhile barriers to entering the andalusite market are relatively high according to CompCom, owing to capital and regulatory requirements with new entrants needing direct access to andalusite deposits. Imerys was putting together evidence to demonstrate that the transaction will not be detrimental to the andalusite and refractories market. South Africa accounted for 40 percent of global supply of andalusite in 2014, making it the world's largest producer. Imerys and Andalusite Resources will continue to argue a case for the merger with plans to appeal the decision through a tribunal process.

OUTLOOK

The andalusite industry is driven by the growth of the refractory industry. The global demand for longer lasting, higher quality and low cost refractories is rising in emerging economies of the Asia Pacific, especially China and India due to rapid economic growth. The refractory industry follows the trend set by the main end user, the steel industry. Steel production makes up the majority of demand for refractories and profitability of the refractories industry is influenced by investment in steel production and steel plants. Although end users other than the steel industry consume less andalusite, they have a strong impact on the growth of the andalusite industry as well. The ceramic, glass, aluminium and cement industry contribute heavily to the growth of this industry. However, fluctuations of major currencies such as Euro and Dollar, rising oil prices and availability of substitutes such as bauxite could hamper the growth of this market over the forecasted period. Since China is the major supplier of bauxite and is holding back on production, andalusite is the next best option for refractory sands and this opens more markets for South African production, especially with most refractory suppliers wanting to reduce their dependence on the Chinese bauxite by using andalusite as a substitute mineral.

Global refractories market was valued at $40.9 billion in 2014 and is expected to reach $54.8 billion by 2020, showing a Compound Annual Growth Rate (CAGR) of 5 percent. In terms of tonnage, the global market was at 39.8 million metric tons in 2014 and is expected to reach 48.6 million metric tons by 2020. China will maintain its top position among countries, with a market share of more than 50 percent in the refractories market. The iron and steel market will continue to dominate global refractories sales, accounting for more than three-fifths of all 2020 product-demand in volume terms.

REFERENCES

1. *Arnold O. Tanner, Kyanite and Related Materials Review, USGS 2015*
2. *Cecil Naude, Andalusite Resources Pty Ltd, Personal communication*
3. *Competition Competition, Competition Matters, 27 May 2015*
4. *Engineering News Online,2014 -2015*
5. *Genine Assis, Samrec Pty Ltd, Personal communication*
6. *Government Gazette No. 39123,General Notices, Economic Development Department Notice 847 of 2015, 21 August 2015,*
7. *Grand View Research, Market Research & Consulting, website: www.grandviewresearch.com/industry-analysis/global-andalusite-market*
8. *Industrial Minerals, 2014-2015.*
9. *Industrial Mineral Forum & Research (IMFORMED), 2015, website:www.imformed.com*
10. *Mineral Economics Directorate, DMR*
11. *Mining Weekly Online, 2015*
12. *World Steel Association, 2014, Crude Steel Statistics Tables pdf*

DIMENSION STONE

R Motsie

SUPPLY AND DEMAND

Globally, there are adequate resources of stone products except for speciality types. Resources can be limited to particular geographical areas based on the lack of the kind of stone that is suitable for dimension purposes. According to *Global Trade Atlas,* the international trade on the quantity of stone products increased by 7.4 percent to 86 Mt in 2014 compared with 80.1 Mt in 2013. In the same period the value of stone products reached $25.83 billion with a determined growth of 1.8 percent.

Slow growth in the local economy coupled with decreases in new residential projects, resulted in a decrease in domestic production of dimension stone. Local sales volumes of dimension stone decreased by 39.5 percent to 155 kt in 2014 (Table 91). Conversely, export sales volumes increased by 4.1 percent to 78.3 kt, due to improved demand from international markets. South Africa's primary crude exports were destined for Italy with the value of R194 million followed by Poland at R66.8 million and China at R35.5 million as the top three trading countries.

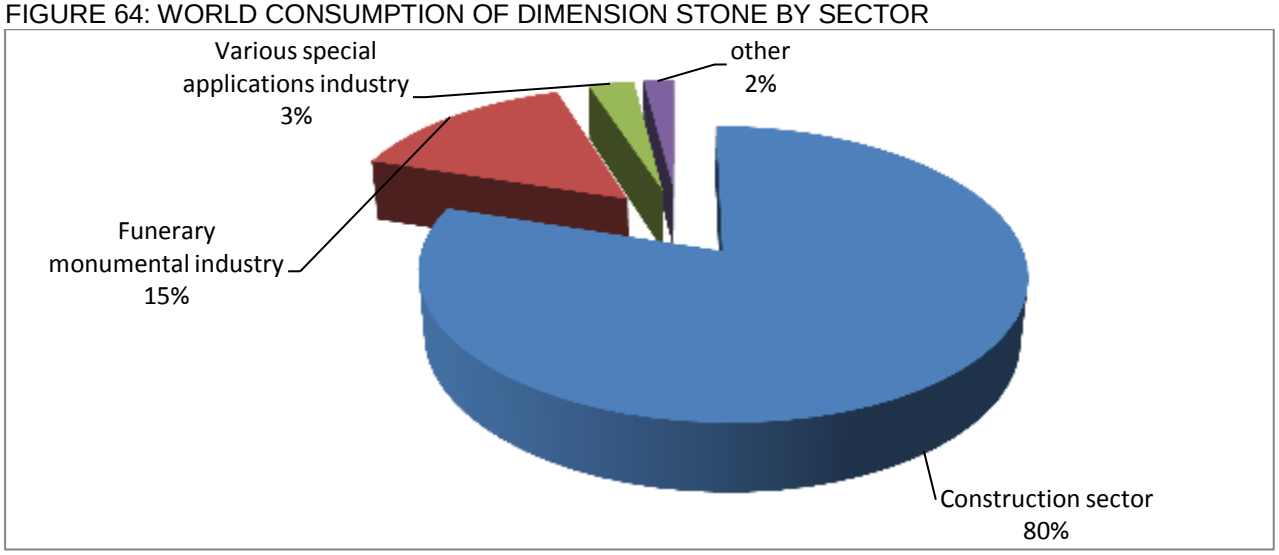
TABLE 91: SOUTH AFRICA'S LOCAL SALES AND EXPORTS OF DIMENSION STONE 2005 – 2014

	LOCAL SALES			EXPORTS		
YEAR	Mass	Value (FOR)		Mass	Value (FOB)	
	Kt	R'000	R/t	kt	R'000	R/t
2005	302.5	165 783	548	305.0	260 493	854
2006	284.4	185 234	651	211.9	209 754	990
2007	394.8	319 455	809	159.3	156 810	984
2008	458.0	489 346	1 069	85.6	211 674	2 474
2009	334.6	340 493	1 018	61.7	126 508	2 050
2010	336.3	236 999	545	65.4	120 407	1 840
2011	271.4	241 802	1 014	111.2	150 212	1 350
2012	213.4	299 717	1 587	84.0	124 246	1 479
2013	256.1	338 568	1 322	75.0	135 477	1 802
2014	155.0	357 963	2 310	78.3	164 769	2 104

Source: DMR, Directorate Mineral Economics
Notes: In the absence of available data, production is taken to be equal to total sales volume

The major application of dimension stone is within the construction sector, which alone accounts for over 80 percent of demand, with the funerary monumental industry accounting for 15 percent and various special applications for around 3 percent (Figure 64). Dimension stone for construction and refurbishment is used in commercial and residential markets.

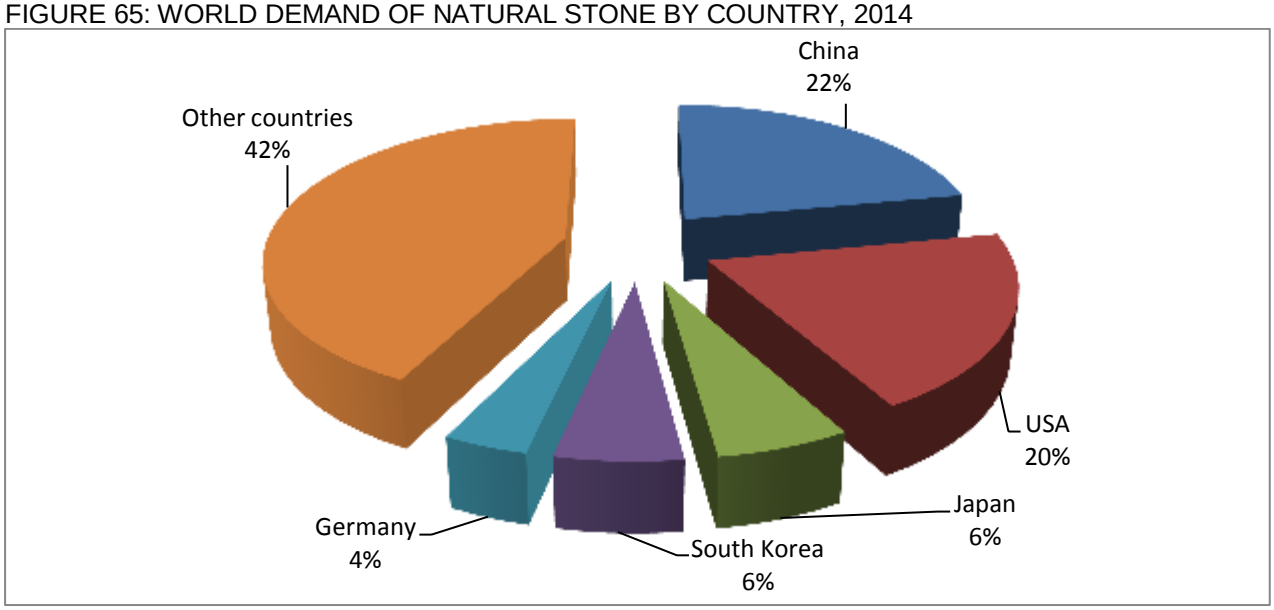
FIGURE 64: WORLD CONSUMPTION OF DIMENSION STONE BY SECTOR



Source: Various publications

Global consumption of dimension stone is driven by a strong demand from China (22 percent), United States of America (20 percent), Japan (6 percent), South Korea (6 percent) and Germany (4 percent), where dimension stone blocks are used for tile production, buildings and in construction activities (Figure 65). According to *IMM Carrara,* world imports of natural stone stood at 39 Mt with a total value of almost $11.3 billion, with a 5.6 percent increase in quantity and a 2.7 percent increase in value compared to 2013. The leading country for imports was China with a market share of $2.5 billion followed by the United States with $2 billion and Germany at $428 million.

FIGURE 65: WORLD DEMAND OF NATURAL STONE BY COUNTRY, 2014



Source: IMM Carrara, Stone sector, 2015

PRICES AND REVENUES

Prices for dimension stone are quite variable and depend on mineral quality and the type of stone. The average local sales prices for rough blocks surged by 74.5 percent to R2 310/ton, while the corresponding sales value increased by 5.7 percent to R357.9 million. Similarly, export sales prices increased by 16.8 percent to R2 104/ton, resulting in a 21.6 percent increase in revenue to R164.8 million due to high quality stone being sold both locally and internationally. Demand for high end stone material is driven by the export market.

EMPLOYMENT

South Africa's dimension stone sector employed 1 723 employees in 2014, a decrease of 3.3 percent compared with 2013 (Table 92). Labour productivity also decreased by 27.2 percent to 0.14 kt/employee, while revenue generated per employee increased by 13.9 percent to R303 385/employee following subdued activity in the construction sector. Average annual earnings were static at R92 534/employee owing to limited growth in the economy.

TABLE 92: SOUTH AFRICA'S DIMENSION STONE EMPLOYMENT AND REMUNERATION, 2010 – 2014

YEAR	EMPLOYEES	TOTAL REMUNERATION
		R'000
2010	2 081	140 990
2011	2 723	425 537
2012	1 819	160 577
2013	1 782	163 473
2014	1 723	159 436

Source: DMR, Directorate Mineral Economics, 2014

KEY DEVELOPMENTS

The prevailing trend in the natural stone industry seems to be a shift towards a shorter global value chain perspective, between upstream and downstream finished products. There have been concerns raised on health and safety issues in emerging economy producers, which have often benefited from a net price advantage resulting from low production costs; it is alleged due to an almost total lack of attention to social and environmental issues. In a bid to curb uncompetitive and unethical practices in the industry, there has recently been an increasing drive towards demand for eco-sustainable stone products by most European countries. The European Commission proposed the need for a renewed strategy in the natural stone sector that promotes corporate social responsibility as a tool to increase competitiveness. This has forced operators to rethink their role and how they manage their companies in terms economic and social conditions of the environment in which the companies operate.

OUTLOOK

In 2014, the world economy grew by 3.4 percent compared to 2013 as a result of modest recovery from advanced countries, which partly offset the slowdown in emerging countries. The growth was attributed to several factors such as the decline in crude oil prices and accommodative monetary policies in the Euro area. In line with the world economy, the construction industry also grew in 2014 by 3 percent compared to 2013.

Demand for lower quality dimension stone stocks is expected to decline in the long-run as China has embarked on a new model of growth, which is less export-oriented and puts more emphasis on quality driven by its internal strength on domestic demand. These developments have seen Chinese buyers of block products become more selective in recent years and this could lead to a build-up of unsold lower quality material in producer countries. Another emerging trend in the global value chain is an attempt to follow European markets, which are increasingly leaning towards products that have been produced in a sustainable manner. This takes into consideration work safety issues and the extent to which the environment has been impacted on, throughout the entire life cycle of products.

Despite the muted growth in the local building sector, South Africa's dimension stone production is expected to gain momentum in the medium-term on the back of increased expenditure in public infrastructure projects. In a bid to unlock economic growth and reduce unemployment, government has put long term measures in place to eliminate poverty and reduce inequality in the National Development Plan. The South African government plans to spend R813.1 billion over the next three years on infrastructure projects, which will encourage economic activity and attract investment. This is in alignment with the government's Strategic Infrastructure Projects (SIPs) programme, in which 18 key priority areas have been identified in advancing the country's social and economic development.

The business confidence level in the local market is improving, which reflects a positive sign of growth in the commodity market. Similarly, prices for dimension stone are expected to rise in future as demand for raw materials in the construction sector improves.

REFERENCES:

1. *Directorate Mineral Economics, DMR*
2. *IMM Carrara, Stone Sector, Annual Report and Prospects for the International Stone Trade, 2015*
3. *Industry Insight, Construction Industry Forecast, 2015*
4. *IMM Carrara, Global Trade Atlas: Processing*
5. *Mineral Commodity Summaries, 2015*
6. *National Treasury. Budget Review 2015/16. February 2015*

FLUORSPAR

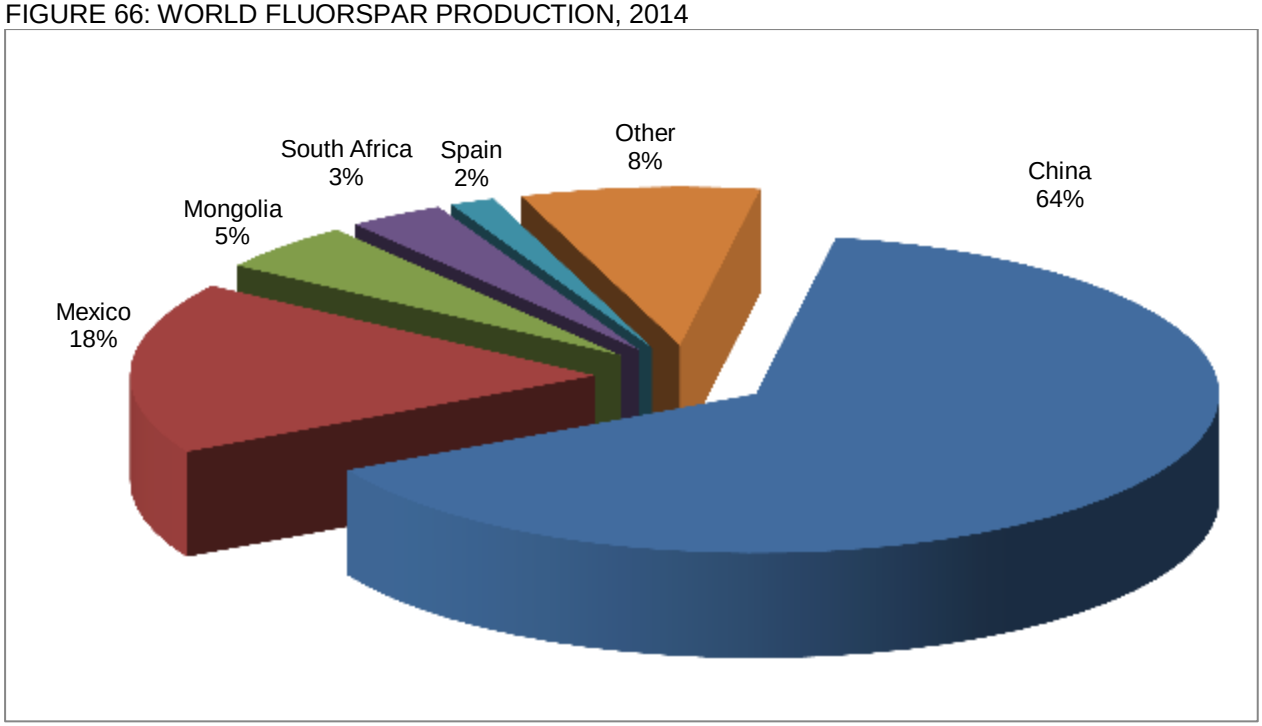
M Modiselle

SUPPLY AND DEMAND

World

Total world production of fluorspar increased by 1.2 percent from 6.77 Mt in 2013 to 6.85 Mt in 2014, as a result of further exploration in the fluorspar market with several junior companies developing projects across the globe. There are new entrants in the world fluorspar production namely Bulgaria, Germany, Iran and United Kingdom (UK). The following countries; Mongolia, Kenya and South Africa's production improved in 2014 as compared to 2013. China remained the world's leading fluorspar producer accounting for 64 percent of world production followed by Mexico's 18 percent, Mongolia's 5 percent, South Africa's 3 percent and Spain's 2 percent (Figure 66).

FIGURE 66: WORLD FLUORSPAR PRODUCTION, 2014



Source: USGS, 2015

The Chinese government withheld fluorspar from the market leading to decreased supply and thus consumption collapsed. The industry is currently facing a crucial moment with new regulations on refrigerants and economic uncertainty that could irreversibly affect future consumption.

This has created a supply/demand imbalance which has generated oversupply worldwide, with consequent downward pressure on prices. The major global fluorochemical producers were negatively affected by the depressed market, mainly in the hydrofluoric acid (HF) market, particularly in the refrigerant sector. This has created greater price competition in the acid grade fluorspar (acidspar) market. Although tight margins are likely to restrict the size of any further decreases, excess capacities are giving consumers greater leverage in negotiations, particularly with Chinese and African suppliers.
South Africa's fluorspar industry continues to struggle among difficult market conditions, uneconomic mining conditions, operational limitations and more recently, China's attempt to dump fluorspar at recorded low prices to smaller companies in the international markets. The dumping has resulted in a weaker demand.

Acidspar has the largest share of fluorspar market, representing about 60 percent of annual consumption, as it is used in the production of HF and 40 percent share for metallurgical grade fluorspar (metspar). In the acidspar market, consumption levels remained low in the major markets of Europe and the United States (US). In the metspar sector, consumption levels were similarly stable with few signs of growth in the industrial end-markets.

South Africa

Vergenoeg mine is jointly owned by a Spanish company called Minerales y Productos Derivados SA (Minersa) with an 85 percent share and MEDU Capital (15%). The other fluorspar producers are Witkop and Buffalo, owned by Fluormin (63%) and Sallies (37%). South Africa is a significant contributor in the African fluorspar portfolio. However, out of the country's three fluorspar mines Vergenoeg mine is the only active producer, while Buffalo and Witkop were closed when the market started to stumble in 2012.

South Africa's fluorspar production increased by 5.8 percent from 155 kt in 2013 to 164 kt in 2014 (Table 93) owing to a slight recovery of fluorspar. Local sales volumes decreased by 17.6 percent to 14 kt in 2014 compared with 17 kt in 2013. Despite having the world largest reserves, South Africa's industry has been underperforming amid sluggish industrial demand. Export sales volumes decreased by 3.7 percent to 131 kt in 2014 compared with 136 kt in 2013 as a result of world oversupply and a lack of demand. The depressed fluorochemical and fluoropolymers markets have led to a significant drop in demand and prices, with new capacities causing increased competition in the heavily discounted market. The majority of the country's exports are shipped to European markets with India joining the major importers from the region. Local and export sales values cannot be disclosed after 2008 and only production, local and export volumes are shown (Table 93).

TABLE 93: SOUTH AFRICA'S PRODUCTION AND SALES OF FLUORSPAR, 2005 – 2014

YEAR	PRODUCTION	LOCAL SALES	EXPORTS
	Kt	Mass Kt	Mass Kt
2005	266	25	250
2006	256	27	218
2007	285	30	252
2008	299	25	276
2009	198	18	135
2010	157	18	179
2011	196	19	175
2012	170	14	189
2013	155	17	136
2014	164	14	131

Source: DMR, Directorate Mineral Economics
*Note: * Sales figures withheld for reasons of confidentiality*

PRICES

Weak demand has plagued the fluorspar market throughout 2014, dragging prices to four-year lows. Slow demand saw prices from Africa slump to new lows as acidspar producers sought to compete with Chinese suppliers, particularly in the Indian market. This price competition fuelled a divergence in the market, as some producers dropped prices to retain market share while others attempted to insulate themselves from price decreases by focusing on quality and efficiency improvements.

Fluorspar prices, particularly those of acidspar, continued to decline in 2014 and the metspar price remained stable. Price declines were largely the consequences of continued global surplus in fluorspar stocks and downstream fluorochemicals. Acidspar prices were put under fresh pressure as new low cost supplies reach the market, pushing prices down further in an already heavily discounted environment. Acidspar prices dropped, as limited demand and inventories backlog throughout the fluorspar supply chain pulled selling values to new lows. One area of the industry that is unlikely to see any change going forward is the metspar market, however, it has stabilised owing to slow and measured growth in the steel market. Prices in the metspar market have therefore been unchanged for the whole year as the recovery in steel markets in Europe and the US has compensated for slowing growth levels in China.

EMPLOYMENT

Productivity increased by 12.9 percent to 0.70 kt per employee in 2014 compared with 0.62 kt per employee in 2013. Average earnings increased by 16.1 percent from R254 841 per employee in 2013 to R295 708 per employee in 2014 (Table 94). Average productivity and per capita payments were higher as a result of fewer employees, which totalled 233 in 2014 compared with 252 in 2013.

TABLE 94: SOUTH AFRICA'S FLUORSPAR QUARRIES: EMPLOYMENT AND REMUNERATION, 2007-2014

YEAR	EMPLOYEES	TOTAL REMUNERATION
		R'000
2007	490	51 608
2008	605	62 027
2009	432	59 128
2010	297	49 836
2011	453	68 467
2012	579	100 409
2013	252	64 220
2014	233	68 900

Source: DMR, Directorate Mineral Economics

KEY DEVELOPMENTS

As a consequence of persistent oversupply, several new projects worldwide are on hold. Despite that, some fluorspar producers did not restrict further exploration in the fluorspar market with several companies developing projects across the globe, awaiting a rebound in industrial demand following China's supply congestion. The status of the projects varies from exploration drilling to mine start-ups

South Africa

The Department of Trade and Industry (the dti) together with Department of Science and Technology (DST), Industrial Development Corporation (IDC) and South African Nuclear Energy Corporation Limited (Necsa) subsidiary Pelchem SOC Ltd are driving a fluorochemical expansion initiative (FEI), that aims to develop South Africa's fluorochemical industry by leveraging the country's rich fluorspar reserves in line with the government's beneficiation strategy.

The chemical sector is one of the sectors that the dti is targeting to build industrial capacity that creates opportunities for industrialisation through the establishment of new fluorochemical manufacturing facilities in South Africa; HF that is a precursor to all fluorine containing molecules, high value, speciality and niche products.

Pelchem SOC Ltd is currently the only fluorspar beneficiation company in South Africa and the Southern Hemisphere. It produces 25 fluorochemical products delivered to 27 countries on 6 continents. Pelchem SOC Ltd continues to drive a strategy of developing opportunities for niche low volume and high value fluorochemical products and has recently added molybdenum hexafluoride (MoF_6) and a range of specialty fluorinated organic compounds to its product portfolio.

Sephaku Fluoride Ltd. (SepFluor) Nokeng and Wallmantshall exploration projects have been put on hold since they been awaiting further investment and financing amid industrial slowdown. In October 2015, SepFluor project received preliminary approval by the lending institutions; however, there have been delays to finalisation of agreements. The delays resulted due to difficulties to secure signed off take agreements with customers owing to the declining acidspar prices. Negotiations with customers have progressed and the project will commence as soon as the lenders gives approval. SepFluor's difficulties were further compounded with high level of impurities including phosphorus and iron oxide present in the country's fluorspar ore.

SA Fluorite Pty Ltd - Doornhoek project is expected to be in production by 2017. The first phase, which is the environmental studies is complete. The progress to date has been sluggish, awaiting completion of metallurgical studies and further financial backing to continue with the project. The marketing studies are to commence soon in order to establish the production capacity.

Africa

After 26 years of operation, Solvay announced that it was indefinitely suspending operations at the Okorusu Fluorspar Mine in Namibia owing to the depletion of higher grade resources. The company was unable to beneficiate the remaining ore owing to both technical issues in the separation of gangue material and unfavourable market conditions. The company was on care and maintenance while undertaking a program of exploration and metallurgical testing on remaining resources.

The Kenya Fluorspar Company has suspended its processing operations due to the weak global demand for fluorspar and the commodity's depressed prices. The company's revenue base was under pressure because of the fall in global demand and competition from new producers. The company has a production capacity of 100 to 120, kt per annum fluorspar and the output is mainly for use in the fluorochemicals market.

International

Masan Resources Group's Nui Phao project in Vietnam operation started its production in the second half of 2014 and was selling small tonnages under short term contracts. The target capacity is 200 kt per annum of acidspar output.

Tertiary Minerals Plc. Storuman project in Sweden is undergoing the final stages of permitting and the Lassedalen project in Norway remains on care and maintenance, awaiting further investment. The Storuman and Lassedalen projects target capacities are 103 kt per annum and 100 kt per annum respectively. Tertiary Minerals Plc. has upgraded the resource at its MB project and this will ease the US reliance on fluorspar imports.

OUTLOOK

The development of new fluorspar projects will see a ramp up in fluorspar production in the next three years which could further widen the gap between the global production capacity and demand, eventually adding pressure to the present supply/demand imbalance. The downturn in fluorochemicals over the past two years created an increasingly hostile environment for fluorspar producers, particularly as the supply chain backlog has mounted. While low demand and oversupply has placed downwards pressure on prices, producers seeking to supply higher-quality material are trying to insulate themselves from further decreases.

Industry analysts reported that the fluorochemicals market is likely to play a pivotal role in the global industrial due to a boost from infrastructure development in emerging economies, generating demand for refrigerants, solvents and fluoropolymers. The speculation over cancellation of China's export tax on HF is likely to trigger demand for acidspar, as increased consumption rates domestically will drive demand up. This will also provide relief to existing stockpiles in the market and driving acidspar prices downwards, as some producers were selling stockpiles at prices below current levels to prevent any recovery in the prices. Prices have been settling at lower levels owing to prevailing uncertainty in the market. Weak demand from fluorochemical markets, coupled with high inventories and new capacities coming on stream, will continue to weigh adversely on fluorspar prices.

The outlook for fluorspar is subject to concerns in the long-term, environmental opposition to the use of some fluorochemical products, safety concerns regarding the use of HF, availability of future fluorspar supplies, as well as a shift in fluorspar consuming industries to Asia, especially China. The shift to Asia presents a challenge owing to China's dominance to fluorspar production, underrating global prices, being the largest exporter globally and flooding the markets with cheaper material. Long-term demand for fluorspar may depend on the development and acceptance of alternatives to fluorocarbon refrigerants, which are likely to be phased out owing to high Global Warming Potential (GWP). Strong replacement candidates are the hydrofluoroolefins HFO-1234yf, HFO-1234ze, and HFO-1233zd.

Fluorspar plays an integral part in South Africa's economy, used in countless industrial processes and downstream industries (e.g. fluorochemicals) that it supports. A larger proportion of fluorochemicals are derived from the mineral fluorspar. The country's current economic growth model is heavily resource and energy-intensive, aggravating pressures on the environment and the threat of climate change. Green mining initiatives and more environmentally-friendly projects are likely to become more economically viable as investors continue to examine the sustainability of companies and mines more carefully.

Growth in demand in fluorspar consumption has been associated with increased production of fluorochemicals that contributes massively to a green economy. The concept of a green economy has gained currency to a large extent as it provides a response to the multiple crises that the world has been facing in recent years, the climate, food and economic crisis. It is an alternative paradigm that offers the promise of growth while protecting the earth's ecosystems and, in turn contributing to poverty alleviation. The country's New Growth Path (NGP) sets a goal of five million new jobs by 2020. It projects that, with the right policies and cooperation, large numbers of green jobs can be created. South Africa has a unique opportunity to create jobs on scale and address the concerns about climate change, through a partnership to promote the green economy and technologies that allow cleaner production processes to green the economy.

There is currently a huge demand for fluorochemicals in Africa and South Africa is well positioned to take maximum advantage of this as the regional industrial powerhouse. Pelchem SOC is already making in-roads into the continent, as the only company in the southern hemisphere that produces fluorochemicals.

REFERENCES

1. *Allan Saad, SA Fluorite, personal communication*
2. *Elize Pretorius, Sallies Limited, personal communication*
3. *Industrial Minerals, 2014-2015*
4. *Johan Brits, Sepfluor Ltd, personal communication*
5. *Kevin Dabinett, Vergenoeg Mining Co (Pty) Ltd, personal communication*
6. *Miller MM, Fluorspar Reviews, USGS*
7. *Mineral Economics Directorate, Mineral Economics Directorate, DMR*
8. *Rajen Naidoo, Pelchem SOC, personal communication*
9. *R115/2015, Is green economy the future for South Africa?, Mineral Economics Directorate, DMR*

LIMESTONE AND DOLOMITE

T Ndlovu and R Motsie

SUPPLY AND DEMAND

South Africa's production of limestone increased by 5.2 percent to 23 Mt in 2015 compared with 2014. Local sales volume increased by 5.3 percent to 20.4 Mt in 2015 as a result of increasing demand in the construction activities, thus boosting revenue to increase by 3.9 percent to R2.9 million (Table 95).

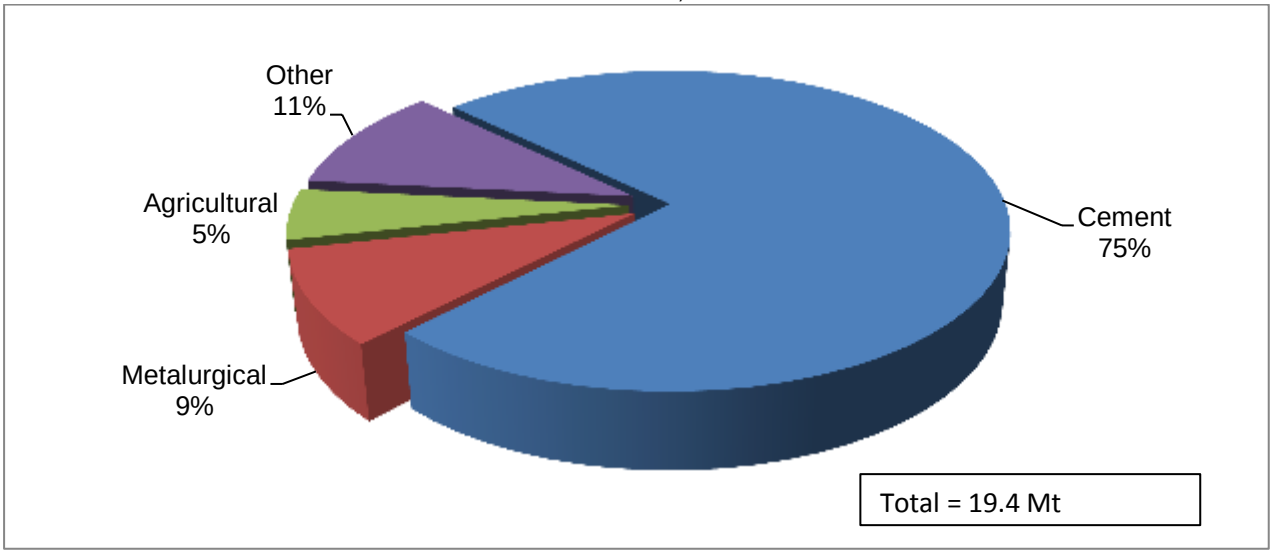
TABLE 95: SOUTH AFRICA'S PRODUCTION AND LOCAL SALES OF LIMESTONE AND DOLOMITE FOR 2015, NONE- AGGREGATE USE, 2006 – 2015

YEAR	PRODUCTION	LOCAL SALES		
		Mass	Value (FOR)	
	kt	kt	R'000	R/t
2006	27 366	20 359	1 517 661	75
2007	23 941	20 493	1 698 586	83
2008	23 495	19 781	1 899 279	96
2009	22 698	20 001	2 099 165	105
2010	22 480	19 226	2 271 133	1 18
2011	21 630	18 507	2 591 727	140
2012	21 637	18 479	2 517 772	136
2013	21 966	20 097	2 804 478	140
2014	21 776	19 340	2 785 855	144
2015	22 919	20 363	2 895 553	143

Source: DMR, Directorate Mineral Economics

The largest users of limestone are cement manufacturers accounting for 75 percent, followed by metallurgical and agricultural applications accounting for 9 percent and 5 percent respectively (Figure 67).

FIGURE 67: DEMAND FOR LIMESTONE BY SECTORS, 2015



Source: DMR, Directorate Mineral Economics

Local sales volume of limestone in the cement manufacturing industry increased by 11.0 percent to 15 Mt in 2015 compared with 13 Mt in 2014 as a result of increased activities in the built construction industry (Table 96). Local sales for metallurgical grade decreased slightly by 0.2 percent. The local steel industry is threatened by cheaper imports from China, which has led to a decline in steel production and consequently demand for limestone in metallurgical application. Local sales volume of agricultural limestone and dolomite increased slightly by 0.3 percent to 990 Mt in 2015 compared with 987 Mt in 2014 following an increased demand from fertilizer applications.

TABLE 96: SOUTH AFRICA'S LOCAL SALES OF LIMESTONE AND DOLOMITE BY APPLICATION, 2006 – 2015

YEAR	CEMENT			METALLURGICAL			AGRICULTURAL			OTHER		
	Mass	Value (FOR)		Mass	Value (FOR)		Mass	Value (FOR)		Mass	Value (FOR)	
	Kt	R'000	R/t	Kt	R'000	R/t	Kt	R'000	R/t	kt	R'000	R/t
2006	14 225	313 038	22	2 183	131 284	60	707	51 779	73	1 533	335 919	219
2007	14 647	350 922	24	1 569	117 847	75	860	59 304	69	1 774	366 980	207
2008	14 252	403 215	28	1 372	120 083	87	879	72 263	82	1 646	381 021	231
2009	14853	461 541	31	1244	118 213	95	855	81 762	96	1616	404 150	250
2010	13458	443 978	33	1 910	190 589	100	783	86 553	109	1 780	447 341	251
2011	12,373	456 522	37	1 745	194 042	111	901	101 081	112	1 948	472 135	242
2012	12 358	463 196	37	1 703	208 933	123	1083	140 557	130	2 125	525 422	247
2013	13 053	496 711	38	1 825	241 671	132	947	133 771	141	3 085	744 057	241
2014	13 099	521 370	40	1 826	258 363	141	987	147 994	150	2 173	617 952	284
2015	14 522	650 093	45	1 822	258 583	142	990	158 924	158	2 049	655 718	322

Source: DMR, Directorate Mineral Economics

KEY DEVELOPMENTS IN THE CEMENT INDUSTRY

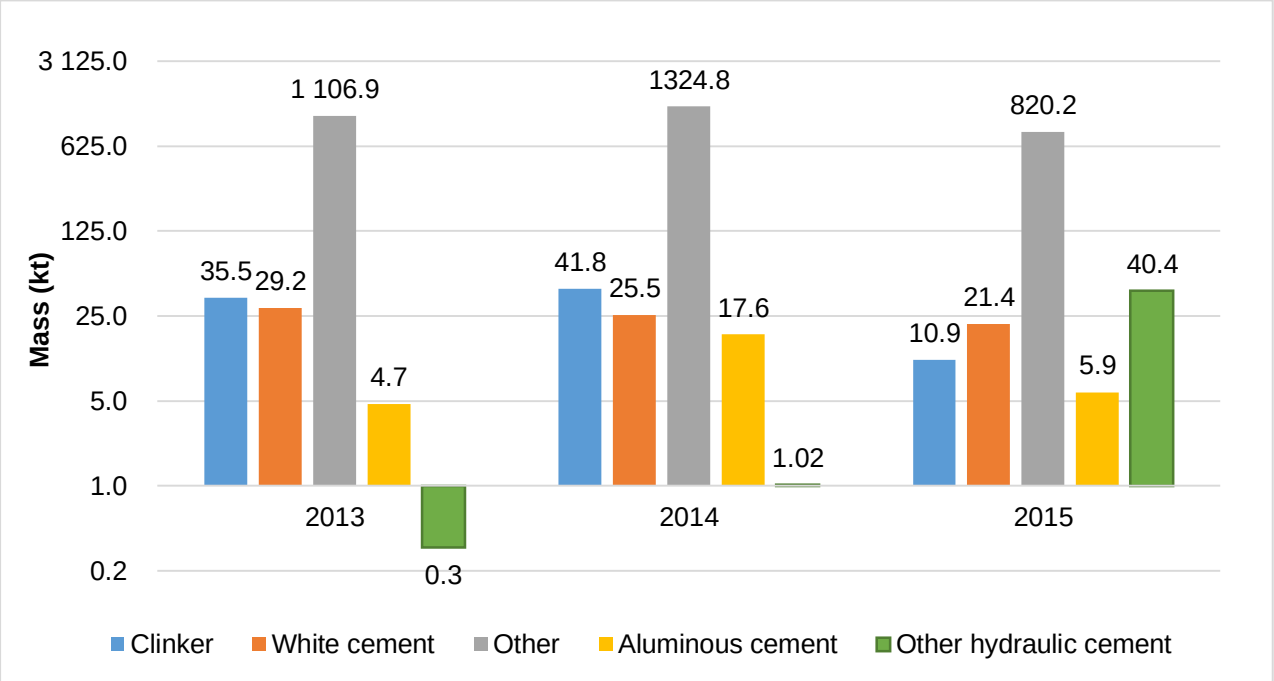
Pretoria Portland Cement (PPC) which has nine cement factories in South Africa, Botswana, Zimbabwe and most recently Rwanda, and a production capacity of 8.6-million tonnes of cement products a year, is planning a R3 billion expansion project (Reebeck plant) near Picketberg in Western Cape, where production will increase by 50 percent to 2.1 Mt/year towards the end of 2016. PPC plans to find new resources in the medium-term, which are needed by its operations in order to engage in some form of exploration and eventual mining close to where urban development is expected in Africa.

PPC's heavy investments are towards building capacity in Africa. It is also expanding its operations in existing markets, where aggregates, metallurgical-grade lime, burnt dolomite and limestone-procurements of Safika Cement and Pronto Ready-mix are also produced. The company is organized to open a cement plant in the Democratic Republic of Congo (DRC) before the end of 2016 and one in Ethiopia in the second quarter of 2017. It is also scheduled to increase production from 8.6 million tonnes a year in 2015 to 12.7 million tonnes in 2018, with an aim of offsetting stiff competition in South Africa and cross-border cement markets. As PPC plans to double its business size every ten years on the back of the continents world-leading rate of urbanization and the African population that is expected to double by 2050, limestone will consequently gain traction in the market.

CEMENT IMPORTS

South Africa's overall imports decreased by 36.3 percent to 899 kt in 2015 compared with 1 411 kt in 2014 (Figure 68). Consequently, value of imports decreased by 26.7 percent to R709 million in 2015 compared with R968 million in 2014. Various cement producers battled it out for market share in 2015 hence the decline in imports. Imports from Pakistan have also been a recurring subject for the South African cement market over recent years.

FIGURE 68: SOUTH AFRICA'S IMPORTS OF CEMENT PRODUCTS, 2013 – 2015



Source: South African Revenue Service, 2015
****Other cement includes white cement*

LIME

Local sales quantity of lime decreased by 6.7 percent to 1.11 Mt in 2015 compared with 1.19 Mt in 2014 due to a decline in volumes of steel production (Table 97). Sales volumes of quicklime for pyrometallurgical and chemical applications plummeted by 7.8 percent to 1.02 Mt, while sales revenue decreased by 6.5 percent to R1.05 billion in 2015 compared with R1.12 billion in 2014. The decrease in revenue was due to chemical industry slowdown and shifting market dynamics. Hydrated lime sales volumes for water purification increased by 12.0 percent from 50 kt in 2014 to 56 kt in 2015, whereas the sales volumes for chemical use remained constant at 11 kt.

TABLE 97: SOUTH AFRICA'S LOCAL SALES OF LIME, 2014 – 2015

LIME PRODUCT,	2014			2015		
BY SECTOR USE	Mass	Value (FOR)		Mass	Value (FOR)	
	Kt	R'000	R/t	Kt	R'000	R/t
Quicklime						
Pyrometallurgical	569	533 949	938	484	451 048	931
Chemical	540	587 749	1 088	539	597 250	1 108
SUB-TOTAL	1 109	1 121 698	1 011	1 023	1 048 298	1 025
Hydrated lime						
Water purification	50	68 230	1 365	56	82 308	1 470
Chemical	11	11 511	1 046	11	11 394	1 036
Other	24	35 166	1 465	24	38 796	1 617
SUB-TOTAL	85	114 907	1 352	91	132 498	1 456
TOTAL	1 194	1 236 605	1 036	1 114	1 180 796	1 060

Sourced: DMR, Directorate Mineral Economics

PRICES AND REVENUE

In 2015, local unit values for limestone decreased slightly by 1.4 percent to R142/t. However, this did not have an impact on revenue as local sales increased by 4.2 percent to R2.9 billion owing to high volumes being traded during the period. Improved activity in the construction industry led to increased demand for limestone used for cement manufacturing, consumption increased by 10.9 percent to 15 kt at R45/t, resulting in a 24.7 percent increase in revenue. Moreover, prices of limestone used in metallurgical and agricultural applications also had a positive uptick, averaging R142/t and R158/t respectively.

EMPLOYMENT

The limestone and dolomite industry employed 2 774 people in 2015, an increase of 4 percent compared with the previous year owing to increasing projects in the construction industry (Table 98). Labour productivity increased by 2.5 percent to 8.3 kt/employee, while revenue per employee also indicated an increase of 0.5 percent to R1 047/employee. Average annual earnings increased by 1.9 percent to R193 931/employee.

TABLE 98: SOUTH AFRICA'S LIMESTONE AND DOLOMITE QUARRIES: EMPLOYMENT AND REMUNERATION, 2010– 2015

YEAR	EMPLOYEES	TOTAL REMUNERATION
		R'000
2010	2 636	409 973
2011	2 723	425 537
2012	2 811	438 208
2013	2 980	468 648
2014	2 673	508 549
2015	2 774	537 967

Source: DMR, Directorate Mineral Economics

OUTLOOK

The active infrastructure expenditure by government in South Africa will see local demand for cement and consequently limestone increasing in the near future. Among other local government infrastructure programmes that are on the pipeline is the R3.7 billion worth project to upgrade Moloto road over the next five years and building of water reservoirs, which will begin in September 2016.

Prices for cement products are expected to decline in the short to medium term on the back of new plants entering the market. This will lead to a downward pressure in prices thus affecting revenues in the long-run. Furthermore, the entrants of new cement producers and planned future operations in the market will ensure sufficient supply in the construction industry thus keeping the limestone and other related mineral sectors stable. As demand rises from different application, prices for limestone are also expected to follow suit. The agricultural sector will see demand for limestone rising as well, following an increasing rate of South African population and an increased rate of consumption from fertilizer industry.

Owing to limited rainfall in 2015, growth in the agricultural sector declined by 5.5 percent compared with 5.9 percent in 2014. This sector contributed 3.7 percent of GDP growth and fell by 0.7 percent in 2015. Nonetheless, phosphates and clinker production is anticipated to improve in 2016 and the cement and limestone companies are expected to do well. Cement imports have dropped by 36 percent soon after anti-dumping import duties of between 14.3 percent and 77.2 percent were imposed, following the influx of cement products from Pakistan.

The construction industry has benefited from increased stability stemming from low materials prices and greater certainty regarding central budgeting and monetary policy. It is furthermore anticipated that 2016 will be a good year for the construction industry. Approximately 6 percent growth will be seen in the year under review, with the construction value reaching $712 billion.

REFERENCES

1. *Business Day News, http://www.bdlive.co.za/business/industrials, accessed 21/06/16*
2. *Cape Business News, http://www.cbn.co.za/manufacturing/chemicals-in-industry, accessed 23/06/16*
3. *Construction Industry Economists, 2016, www.forconstructionpros.com/.../construction-industry-economists-predict-continued-industry-growth, accessed 15/07/2016*
4. *Department, agriculture, forestry and fisheries, crop estimate committee, 2015*
5. *DMR, Directorate Mineral Economics*
6. *Engineering News, PPC Planning to Double Every Ten Years, http://www.engineeringnews.co.za/articles, accessed 20/05/16*
7. *Industry Insight, State of the South African Civil Industry, 2015*
8. *PPC, Annual Integrated Report. 2015*
9. *Sephaku Cement, http://www.sephakucement.co.za/News.php, accessed 21/06/16*
10. *South African Revenue Service (SARS)*

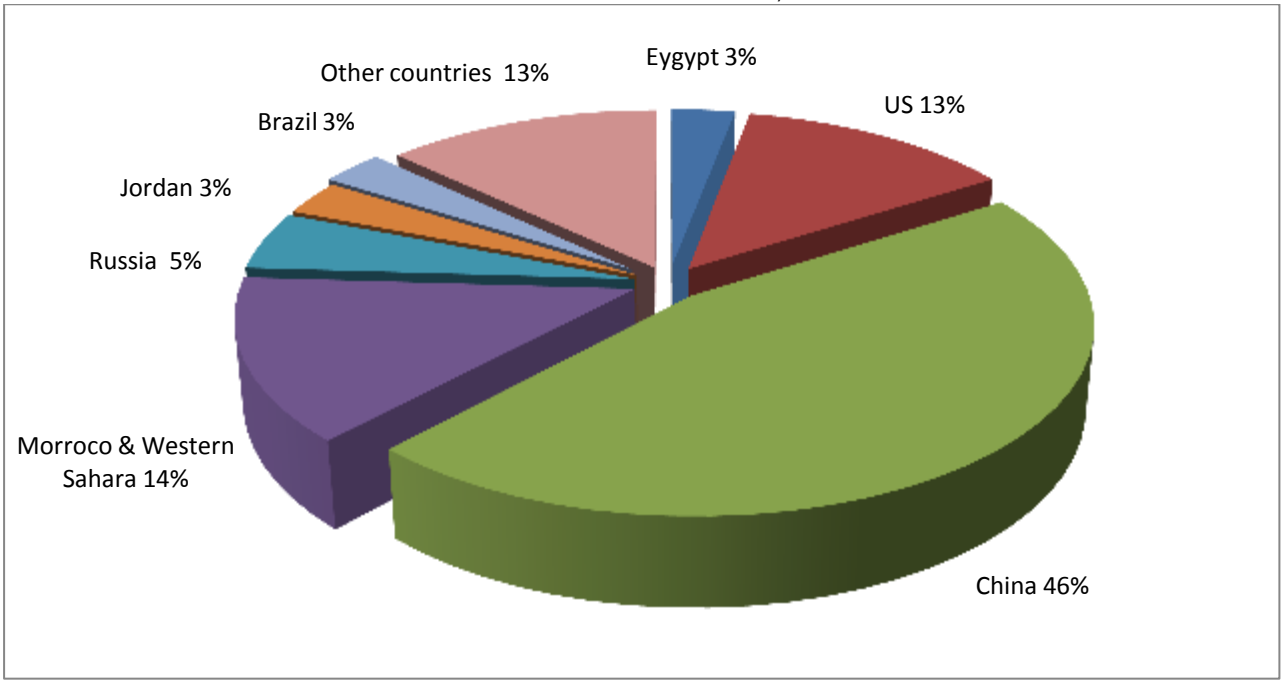
PHOSPHATE ROCK

M Muravha

SUPPLY AND DEMAND

World production of phosphate rock decreased by 2.2 percent to 220 Mt in 2014 compared with 225 Mt in 2013, owing to lower phosphoric acid and fertiliser demand. China is the world's largest phosphate producing country, accounting for 46 percent of production followed by Morocco & Western Sahara at 14 percent and the United States at 13 percent. Morocco & Western Sahara overtook the US and are now ranked second in the world (Figure 69).

FIGURE 69: PHOSPHATE ROCK PRODUCTION BY COUNTRY, 2014



Source: USGS, 2014

South Africa's production of phosphate rock decreased by 5.7 percent from 2 131 kt in 2013 compared with 2 011 kt in 2014. Factors contributing to the shortfall are ore supply challenges, as well as operational challenges at the country's largest producer, Foskor. These ranged from low flotation efficiencies due to poor water quality resulting from Selati Tailings Dam failure, closure of the D-Bank flotation plant due to structural integrity problems and failure of the Extension 8 ball mill. Foskor produces a highly sought after grade.

Local sales volumes increased by 0.3 percent to 1 640 kt compared with 1 634 kt in 2013. Export volumes increased by 33.0 percent from 170 kt in 2013 to 227 kt in 2014 (Table 99).

TABLE 99: SOUTH AFRICA'S PRODUCTION AND SALES OF PHOSPHATE ROCK, 2002– 2014

YEAR	PRODUCTION	LOCAL SALES	EXPORTS
	Mass	Mass	Mass
	Kt	kt	Kt
2002	2 803	2 532	349
2003	2 643	2 665	250
2004	2 735	2 484	268
2005	2 577	2 498	91
2006	2 629	2 252	0
2007	2 556	2 523	36
2008	2 287	2 687	0
2009	2 237	2 268	0
2010	2 148	1 880	25
2011	2 575	2 155	194
2012	1 831	1 415	620
2013	2 131	1 634	170
2014	2 011	1 640	227

Source: DMR, Directorate Mineral Economics

According to United States Geological Survey (USGS), world resources of phosphate rock are more than 300 000 Mt while world reserves are estimated at 67 Bt. Morocco holds the world largest reserves of Phosphate rock at 50 Bt, followed by China's 3.7 Bt and Algeria at 2.2 Bt. South Africa is ranked at 5th position with 1.5 Bt.

Foskor mine can produce 2.6 Mt of rock at full capacity and has an expected life of mine of 70 years. Phosphate rock produced is used for the production of phosphoric acid which is sold locally and also exported to Europe, Japan and New Zealand. Sulphuric acid is combined with the rock concentrate from the mining division to produce phosphoric acid. The phosphoric acid is either exported in its acid form, and sold locally, or used in the production of granular fertilizer, which is mainly sold locally. The Acid Division at Foskor has three production plants, for sulphuric acid, phosphoric acid and granular fertilizer. The company also produces coated and uncoated granular fertilisers such as MAP (Monoammonium Phosphate), DAP (di-ammonium phosphates) and MAPz (MAP with zinc).

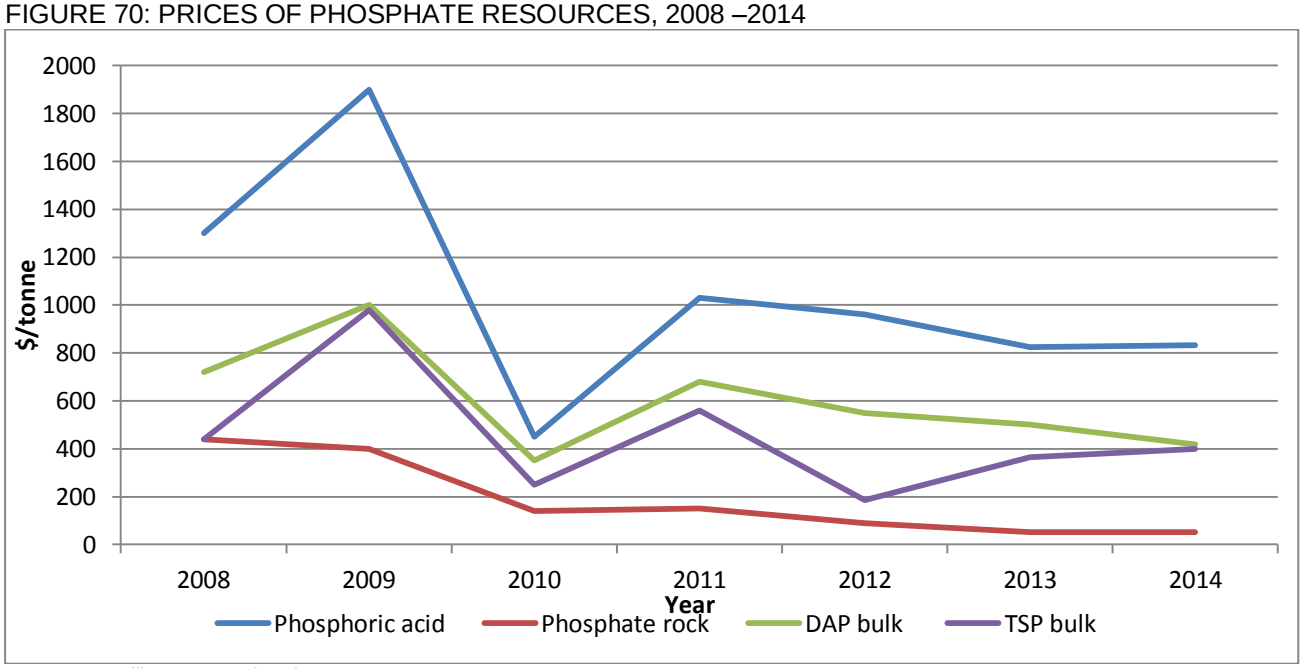
Globally, most of the phosphate rock produced is used in the manufacture of phosphoric acid. More than 95 percent of phosphate rock mined from the United States was used to manufacture phosphoric acid and super-phosphoric acid, which were used as intermediate feedstock in the manufacture of granular and liquid ammonium phosphate fertilizers and animal feed supplements. Approximately 45 percent of the wet phosphate fertilizers (DAP and MAP) are merchant grade phosphoric acid. The balance of the phosphate rock was used for the manufacture of elemental phosphorus, used to produce phosphorus compounds for a variety of food-additive and industrial applications. Demand for phosphate products surged in 2014, driven by record US imports, a rising requirement from Brazil and rebound in the Indian market. The demand was met by increased exports from China, Morroco and Saudi Arabia.
According to IFA International Fertilizer Association, global traded volumes stand at 26.2 Mt. China, US, Russia and Morocco account for most of the traded volume while India alone accounts for around half of global imports. India's role as a major import market for excess Chinese phosphate production makes the trade between the two countries a key supply/demand relationship internationally. China's proximity to India makes it one of the most prominent players in setting prices globally. South Africa's Foskor, is one of the largest suppliers of phosphoric acid to India. The company also supplies other countries including Europe, the Middle East, North and South America as well as sub-Saharan Africa.

PRICES

The average phosphate rock price increased by 3.9 percent to $53/t in 2014 compared with $51/t in 2013 while the average phosphoric acid price increased by 0.8 percent to $832/t in 2014 compared with $825/t in 2013. Diammonium phosphate (DAP) price decreased by 16.2 percent to $419/t and trisodium phosphate (TSP) price increased by 9.0 percent to $398/t in 2014 (Figure 70). Phosphate rock prices fell throughout 2013, and only rose again during quarter 1 of 2014 continuing to fall again throughout 2014. Phosphate markets have been characterized by a wait and see approach, especially as Indian and

Brazilian buyers hold off buying. Chinese suppliers have been mainly preoccupied with meeting home market needs. The Brazilian market has been quiet leading to wide variations in price expectations.

FIGURE 70: PRICES OF PHOSPHATE RESOURCES, 2008 –2014



Source: Fertilizer International, 2015

EMPLOYMENT

Locally, employment decreased by 11.3 percent to 3 242 employees due to decreased number of contractors approved for projects. Companies are cutting down on spending in response to weak economic conditions coupled with weak commodity prices, higher wages demands and high electricity and water rates. Remuneration decreased by 10.1 percent to R789.5 million from R878.6 million. Each employee generated R243.5 thousand in 2014, an increase of 3.0 percent when compared with R236.4 thousand in 2013. Productivity decreased by 58.2 percent to 243.5 t per employee per year due to aforementioned decrease in employment and production.

OUTLOOK

Globally, major factors such as commodity price falls in agriculture, changes to phosphate trade flows, the oil price collapse and the strong dollar all influenced the global phosphate market in 2014. The performance of the world economy, possible weather-related crop shortfalls, unexpected changes to fertilizer subsidy regimes and new policies on nutrient use efficiency could all confound current expectations. According to CRU, the number of mining projects in the pipeline means rock phosphate capacity has the potential to rise to 95 million tonnes by 2018, almost four fifths increase, whereas demand is only projected to rise by 17 million tonnes over this period. Subsidy changes in India and more stable, moderate prices are likely to see Indian phosphate demand back on a growth trajectory during the last half of this decade. In future, the phosphate market will partly hinge on agricultural commodity price trends and whether the predicted rise in demand from India comes through

Global phosphoric acid demand is forecast to grow at an annual rate of 2,4 percent compared between 2014 and 2019 to 48 Mt P_2O_5. Phosphoric acid supply/demand dynamics indicate a stable potential balance in the short term and a moderately growing potential surplus late 2018 and into and early 2019.

Phosphate rock and phosphoric acid prices have been decreasing since 2011 due to weak global market conditions. However, in 2014 prices began to firm up and have increased slightly in 2015 on the back of improved demand. The increased product availability may prompt a fall in prices, although this could be avoided if demand in Brazil and India revives.

South African production is expected to increase slightly due to improved efficiencies at the country's leading phosphate producing mine (Foskor). Plans and programmes towards securing food for South Africa have taken shape in line with government commitment to secure food for all South Africans as

outlined in the objectives of the National Development Plan. In 2014 the heads-of-state of African countries signed the Malabo Declaration to affirm their commitment to the eradication of hunger and to halve poverty by 2025. All 54 member states of the African Union signed the declaration. By signing this declaration, each country agreed to adopting sound policies for agriculture and rural development and allocating at least 10 percent national budgetary resources to implementation of these policies in five years.

More studies are currently being conducted to unpack the strong linkages between the mining industry and the agricultural industry towards national security which encompasses social development of rural communities, employment creation, economic growth and food security.

REFERENCES

1. *Fertilizer International magazine, 2014/2015*
2. *Foskor Integrated Annual Report 2014*
3. *Patrick Heffer and Michael Prud'homme, Fertilizer Outlook 2015-2019. International Fertilizer Industry Association*
4. *United States Geological Survey, Mineral Commodity Summaries, Phosphate Rock, January 2015.*
5. *http://www.integer-research.com/2012/fertilizers-chemicals*

SPECIAL CLAYS

M Muravha

SUPPLY AND DEMAND

Bentonite, kaolin and attapulgite are among the most important clay minerals used by the manufacturing and environmental industries. These are industries that generate revenue associated with environmental protection, assessment, compliance with environmental regulations, pollution control, and waste management. Demand for these minerals has changed with time as a result of technological advances; clays remain a part of everyday lives. Existing end markets continue to grow while new end markets are also introduced.

Bentonite can adsorb toxins and bacteria, reducing their negative impact. For instance, dilute clay suspensions can control potato scab, caused by Streptomyces scabies. It is also used to improve the viscosity and suspension properties of aqueous spray applications used for crop protection. The market for crop protection products (including herbicides, insecticides and fungicides) has also been growing providing a big opportunity for minerals to provide environmental improvements and reduce the risk of contaminating foodstuffs by replacing toxic chemicals or by reducing their application. Legislation around the use of fertilizers and pesticides to prevent contamination of land and water systems and potential harm to human health is increasingly being tightened.

Amongst other uses, bentonite is used as a buffer, backfill and sealing material in waste disposal, and its usage depends on the type of waste and on the disposal concept of each country There has been increased interest globally in the bentonite disposal method, boding well for future demand growth Bentonite is preferred for waste disposal for its low hydraulic permeability in a saturated state. It also has an advantage of swelling pressure which ensures a self-sealing ability and closes gaps in the installed barrier and the excavation-damaged zone around the emplacement tunnels. Bentonite and barite have been used as part of the conventional drilling processes for years, but in 2014 the minerals saw increased use in hydraulic fracturing.

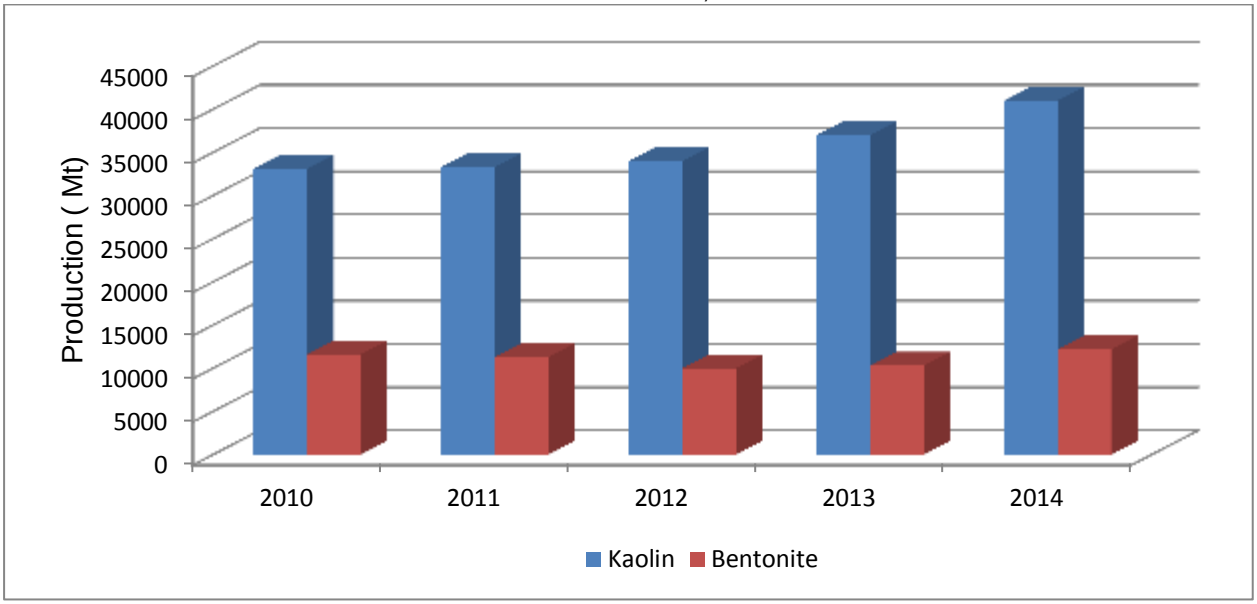
On the other hand attapulgite is used in adhesives, animal feed, cosmetics, pharmaceuticals, drilling muds, fertilizers, oil and grease absorbents, pesticides and related products.

Kaolin which is also known as china clay is used mainly for paper production, where it is used as a coating material. It is also used in great quantities in the paint, rubber, plastic, ceramic, chemical, pharmaceutical, and cosmetics industries. Kaolin is further used in the production of surround; a new product for crop protection. Surround is highly refined sedimentary kaolin which is calcined and treated with chemicals to aid adhesion to the fruit and spreadability. Kaolin plays a role in addressing another emerging challenge locally and worldwide, water scarcity.

Total world kaolin production increased by 1.7 percent from 40.3 Mt in 2013 to 41.0 Mt in 2014 (Figure 71). Demand from the paper end market has begun to pick up once more after a fall due to paper substitution by electronics. Uzbekistan accounted for 17.1 percent of the total world production of kaolin followed by the United States (US) and Germany at 11.0 percent.

Global bentonite production remained constant at 12.0 Mt (Figure 71). Demand came from drilling mud, foundary sand bond, and civil engineering applications. The US accounted for 38.2 percent of total world bentonite production, followed by Turkey at 9.0 percent, Greece and Italy at 8.2 percent. Unconventional hydrocarbon recovery through hydraulic fracturing and horizontal drilling was the main driver for demand in 2014. Demand for proppant minerals: frac sand and those used in ceramic proppants, kaolin and bauxite also saw an increase in demand last year.

FIGURE 71: WORLD PRODUCTION OF SPECIAL CLAYS, 2014



Source: USGS, 2014

In South Africa, rising wealth, urbanization and a fast-growing middle class have changed the country's consumption patterns leading to new food patterns that are more land and water-intensive than fruit, vegetable and grain crops. Most of the required increase in agricultural production is expected to come from raising yield per acre, rather than a significant expansion in agricultural land area. Nutrients, some of which are produced from minerals play a pivotal role in this regard. Kaolin and bentonite both have significant roles to play in crop protection.

South Africa's production of kaolin increased by 16.6 percent from 22.3 kt in 2013 to 26.0 kt in 2014 due to increased demand from paper end-market (Table 100). Volumes sold locally decreased by 41.2 percent to 20.7 kt while local sales value decreased by 29.5 percent to R11.8 million in 2014 compared with the previous year owing to lower unit values.

TABLE 100: SOUTH AFRICA'S PRODUCTION, LOCAL SALES OF KAOLIN, 2003-2014

YEAR	PRODUCTION	LOCAL SALES		
		Mass	Value (FOR)	
	Kt	Kt	R'000	R/t
2003	86.4	72.9	40 573	556
2004	81.9	67.8	42 880	633
2005	59.4	52.7	30 321	575
2006	51.6	39.1	15 809	404
2007	50.8	39.3	10 232	260
2008	39.2	33.5	9 068	271
2009	31.0	30.1	9 343	311
2010	29.9	28.2	9 960	353
2011	15.2	22.4	10 375	463
2012	20.4	21.9	12 187	586
2013	22.3	35.2	16 740	475
2014	26.0	20.7	11 805	570

Source: DMR, Directorate Mineral Economics
Source: # RSA, Commissioner for South African Revenue Services, 2003-2014
Notes: Import figures also include "other kaolinitic clays"

South African bentonite production decreased by 11.5 percent to 156.8 kt in 2014 from 177.2 kt. Demand from the foundary and the ferrochrome end markets dwindled in 2014 due to weak economic conditions. Furthermore, local sales volumes decreased by 33.0 percent from 169.6 kt in 2013 to 113.6 in 2014, while local sales value decreased by 52.9 percent to R57.9 million (Table 101). Softer demand for bentonite in the wake of declining consumption in foundry markets has led to a negative shift in prices for the mineral.

Consequently, there were no exports from SA for bentonite in 2014, as a result of the subdued economic conditions globally.

Bentonite is used mainly in construction projects in South Africa, for example, bentonite supplied to Eskom's Medupi project by Ecca Holdings as well as bentonite used as a binder at Xstrata Process Support (Glencore). High transportation costs for low value commodities like bentonite continue to be a challenge for suppliers; however, both suppliers and consumers are still benefiting marginally from each other.

TABLE 101: SOUTH AFRICA'S PRODUCTION, LOCAL SALES AND EXPORTS OF BENTONITE, 2003-2014

YEAR	PRODUCTION	LOCAL SALES			EXPORTS		
		Mass	Value (FOR)		Mass	Value (FOB)	
	Kt	Kt	R'000	R/t	Kt	R'000	R/t
2003	145.1	74.4	31 210	420	11.0	3 728	338
2004	55.9	75.5	35 662	473	10.5	5 956	566
2005	139.8	75.9	35 738	471	6.9	4 778	688
2006	32.9	75.1	39 005	520	4.0	2 887	715
2007	45.8	87.3	49 749	570	3.2	2 434	761
2008	44.1	96.1	64 670	673	3.4	4 399	1 294
2009	40.3	59.8	37 585	628	1.8	2 529	1 393
2010	82.3	124.6	82 594	659	1.3	1 667	1 293
2011	120.4	177.0	118 344	669	0.165	255	1 551
2012	120.6	159.9	119 629	748	0.021	29	1 412
2013	177.2	169.6	123 077	726	0.080	139	1 749
2014	156.8	113.6	57 914	510	0	0	0

Source: DMR, Directorate Mineral Economics

Locally, about 90 percent of attapulgite is used for cat litter and the rest for environmental purposes (filtration of various products – acid, water, and oil). During 2014 almost all attapulgite produced was was sold locally. South Africa's production of attapulgite decreased by 20.9 percent from 21.2 kt in 2014 to 16.7 kt in 2014 mainly driven by a decreased demand for cat litter. Volumes sold locally increased by 3.0 percent to 16.7 kt in 2014 whilst the corresponding sales values decreased by 10.3 percent to R7.5 million as a result of lower unit prices (Table 102). Cat litter could be one of the necessities that consumers cut on as they begin to feel the effect of macroeconomic economic conditions. Attapulgite produced in South Africa remains largely for local consumption. However, suppliers are hopeful of the potential presented by the growing niche market in drilling mud worldwide.

TABLE 102: SOUTH AFRICA'S PRODUCTION, LOCAL SALES AND EXPORTS OF ATTAPULGITE, 2003-2014

YEAR	PRODUCTION	LOCAL SALES			EXPORTS		
		Mass	Value (FOR)		Mass	Value (FOB)	
	Kt	Kt	R'000	R/t	T	R'000	R/t
2003	14.6	14.5	6 750	466	0	-	-
2004	20.4	20.2	8 962	443	0	-	-
2005	33.7	29.8	10 785	362	0	-	-
2006	49.2	49.0	13 201	270	0	-	-
2007	68.4	68.4	17 989	263	0	-	-
2008	69.9	69.9	20 783	297	0	-	-
2009	54.4	54.2	16 015	295	0	-	-
2010	57.6	57.3	17 585	290	0	-	-
2011	14.4	14.4	6 572	455	0	-	-
2012	15.8	15.9	7 171	452	0	-	-
2013	21.2	15.4	8 417	547	0	-	-
2014	16.7	16.7	7 549	451	0	-	-

Source: DMR, Directorate Mineral Economics

The paper industry consumes about 50 percent of kaolin. However, the industry has been subjected to disruptive digital technology that has threatened the livelihood of some of the paper companies reducing demand for some of the raw material used to manufacture paper. The paper end market is still declining but expected to reach stability in the short term. The consumption of kaolin is led by Asia accounting for 36 percent of demand, Europe and North America accounting for 30 percent and 24 percent respectively. Kaolin is also used as filler, while ground and precipitated calcium carbonate are substitutes. Production in North America has been declining because of the competition with calcium carbonate and imports from Brazil, leading to industry consolidation resulting in 6 companies within the industry…..

About 53 percent of bentonite production is consumed by the absorbents and the drilling mud end-markets. With the increasing global demand for gas and oil, consumption in the oilfield market has expanded, although the idea of hydraulic fracturing has not yet been fully embraced in most countries owing to the impact on environment. North America remained the largest market for bentonite. In 2014, the hydraulic fracturing boom also created a renewed interest in ceramic proppants and new producers entered, or announced plans to enter, the ceramic proppant market.

PRICES

The kaolin price for No 1 paper coating grade decreased by 14.7 percent by the end of 2014 compared with 2013, while No 2 paper coating grade, ex-works USA also increased by 4.2 percent in 2014 compared with 2013 (Table 103).

The prices for cat litter grade FOB Kandla and FOB European port remained unchanged in 2013 and 2014. US bentonite (ex-works Wyoming) remained stable except for the American Petroleum Institute (API) grade, bagged, railcars, ex-works Wyoming and Iron Ore Pelletising (IOP) grade, crude, bulk, ex-works Wyoming. The API grade decreased from a range of $97-124/s.ton in 2013 to a range of $92-130/s.ton in 2014. The Iron Ore Pelletising (IOP) grade remained constant at a range of $68-77s.ton in 2014. The Indian, crushed, dried, loose, in bulk, cat litter grade prices have now remained constant for four consecutive years since 2010. The largest global producer of kaolin, Imerys, will now be subjected to price control for the supply of kaolin, following its acquisition of Goonvean. Bentonite prices have remained stable within regular ranges, despite the ongoing weakness in the oil market, according to industry sources.

TABLE 103: WORLD PRICES OF KAOLIN AND BENTONITE, 2013-2014

KAOLIN	**2013**	**2014**
No 1 paper coating grade	$163-211	130-180
No 2 paper coating grade	$110-168	112-175
BENTONITE	**2013**	**2014**
Cat litter, grade 1-5 mm, bulk, FOB Main European port	€42-60	€42-60
Indian, cat litter grade, crushed, dried, loose, in bulk, FOB Kandla	$34-38/s.ton	$34-38/s.ton
Oil Companies Materials Association (OCMA)/Foundry grade, crude and dried, bulk, FOB Milos	€60-80	€60-80
American Petroleum Institute (API) grade, bagged, railcars, ex-works Wyoming	$97-124/s.ton	$92-130/s.ton
Foundry grade, bagged, railcars, ex-works Wyoming	$90-130/s.ton	$97-124/s.ton
Iron Ore Pelletising (IOP) grade, crude, bulk, ex-works Wyoming	66-72/s.ton	$68-72/s.ton

Source: Industrial Minerals

EMPLOYMENT

South African special clays industry consists of 9 companies employing a total of 323 employees Table 104). Employment in the sector decreased by 1.5 percent compared with 328 in 2013, Due to the end of construction on several projects. Average remuneration decreased by 2.5 percent from R37.1 million in 2013 to R36.2 million in 2014. Each employee generated R112 219 thousand in 2014 compared to R113.300 thousand in 2013, a decrease of 1.0 percent. Productivity decreased by 8.2 percent from 0.673 kt. per employee in 2013 to 0.618 kt per employee in 2014.

TABLE 104 - SOUTH AFRICA'S SPECIAL CLAYS EMPLOYMENT, 2009-2014

Year	Employees	Remuneration
2009	249	18 945 656
2010	294	22 604 229
2011	333	31 501 001
2012	353	35 154 401
2013	328	37 188 650
2014	323	36 246 841

Source: DMR, Directorate Mineral Economics

KEY DEVELOPMENTS

Bentonite producer AMCOL International Incorp. which was the target of a bidding war between speciality minerals and refractories company Minerals Technologies Inc. (MTI) and French industrial minerals multinational, Imerys in 2014? After several months of counter bid after counter bid, US-based MTI finally won the battle and concluded a merger in May.

Towards the end of 2014 Halliburton announced it would buy Baker Hughes Inc. to create a combined Houston-based global oilfield services provider. Both companies are leading producers and providers of oilfield minerals including bentonite and barite.

OUTLOOK

The year 2014 saw an increase in hydraulic fracturing in many countries. Hydraulic fracturing has been increasing over the last few years indicative of the demand for oilfield minerals that will become even stronger. Continued drilling and exploration kept demand high for these oilfields minerals during 2014. However, in 2015 hydraulic fracturing activity slowed down as a result of low oil prices causing companies to close and decline, as a result reducing demand for minerals used in processes. Fortunately, long term demand for oil and gas is expected to drive a recovery. Demand from the oil fields end market is expected to increase further as more countries embrace the much debated hydraulic fracturing process.

Demand for use of kaolin in ceramic proppants is expected to increase in the short term. Kaolin market struggled with the threat of substitution and the dramatic consolidation of the industry, but lately kaolin is slowly reclaiming its position as the preferred material in the paper and pulp industry. Currently, there are a number of global projects online for the paper industry that are also expected to increase demand for kaolin. However, demand is expected to increase, as GDP of most countries increases. According to the Industrial Minerals Magazine, worldwide consumption of paper and board is set to grow by approximately 2-2.5 percent for the next two decades. Prices are forecast to increase slightly but not to largely affect demand. South Africa's kaolin output is expected to continue rising on the back of government's infrastructural programmes that are in the pipeline.

The bentonite industry continues to thrive amidst challenges with substitute minerals. Logistics costs and energy issues continue to plague most industrial minerals markets which are high bulk with low revenue. However, strong demand from the end-markets, such as clay uses in niche markets like the drilling rigs, can be expected to steady the market supply situation for minerals like bentonite. According to the Industrial Minerals Magazine, global production of bentonite is expected to increase by approximately 2.5 percent per annum to 17 Mt by 2016. Prices are expected to increase further, as demand for minerals increases. Therefore, larger exploration programmes into difficult mining areas will be required.

South Africa's production of bentonite is forecast to decrease slightly after completed Eskom's Medupi project .However; another Eskom power station project (Kusile) could offset the slight decline. The approval of exploration for shale gas reserves in the Karoo might just be the boost the industry needs as bentonite will be needed for the drilling process during exploration. Another market that is emerging is the waste disposal market and is expected to improve demand in the short term. Bentonite industry continues to blossom as it has a wide range of end-uses. Since bentonite is also used a substitute for other clays, producers are also expected to shift to bentonite once it's affordable or cheaper.

REFERENCES

1. *Industrial Minerals magazine 2014,2015*
2. *Mike Faure, Atta Clay: Attapulgite, personal communication*
3. *Roskill Information Services, Ltd.*
4. *Mineral Economics Directorate, DMR*
5. *The Fredonia Group Inc.*
6. *USGS. Mineral commodities, 2015*
7. *Verdine Donnelly, Ecca Holdings/SAMREC: Bentonite personal communication*
8. *DMR, Special Clays Industry In The Republic of South Africa,2009*
9. *http:// www.automationworld.com/pulp-and-paper*

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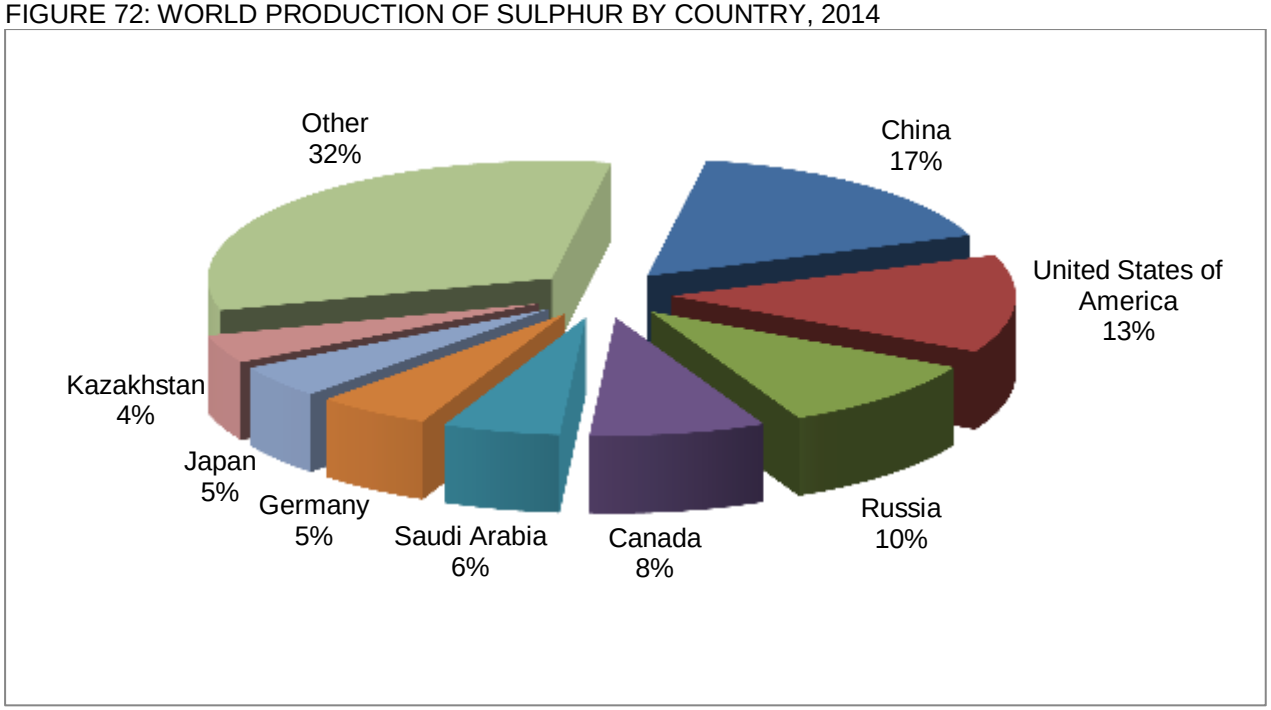
SULPHUR

M Modiselle and T Ndlovu

SUPPLY AND DEMAND
World

World production of sulphur in all forms (SAF) increased slightly by 1 900 kt from 70.5 Mt in 2013 to 72.4 Mt in 2014 due to the stabilization of fertilizer demand. An increase in phosphate fertilizer consumption is led by a higher demand for sulphur hence an increase in production. China was the largest producer accounting for 17 percent, followed by the United States of America (USA) at 13 percent and Russia at 10 percent (Figure 72).

FIGURE 72: WORLD PRODUCTION OF SULPHUR BY COUNTRY, 2014



Source: USGS, 2015

Demand for sulphur is mostly driven by the phosphate market. The sulphur market stabilised from the extreme swings in demand and prices witnessed in 2013 and 2014. The sulphur market experienced some tightness because of lack of availability from producers in the Middle East countered by limited spot demand from major importer, China. China has always been labelled as the strikingly sulphur attractive consumer, however over the last year this has changed slightly as the market became more stable.

South Africa

In South Africa, elemental sulphur is recovered from pyrite, sulphide smelter gasses mainly in the platinum mining industry, coal and crude oil. Most elemental sulphur is converted to sulphuric acid. In 2014, most of the sulphur was recovered as a by-product from one oil refinery/ synthetic fuels producer, eighteen platinum mines, one zinc mine and one copper mine. South Africa's production of sulphur in all forms (SAF) increased by 2.5 percent from 270 kt in 2013 to 277 kt in 2014 (Table 105). SAF includes elemental sulphur and sulphuric acid. Sulphur recovery from synthetic fuels registered a 9.6 percent increase to 175 kt in 2014.

Sulphuric acid production from the copper mine, Palabora Mining Company (PMC) decreased by 9.6 percent to 69.5 kt in 2014 compared with 76.9 kt in 2013 owing to the divestment of Rio Tinto and Anglo American in 2013. There was no sulphuric acid production from zinc mines in 2014 as the producer ceased operation. Sulphuric acid production from PGM mines decreased by 3.2 percent to 32.9 kt in 2014 compared with 34 percent in 2013, due to prolonged strike that affected major producers. There was no sulphuric acid production from gold mines in 2014 (Table 105).

TABLE 105: SOUTH AFRICA'S PRODUCTION OF SULPHUR IN ALL FORMS, 2013-2014

SOURCE	2013		2014	
	Mass		Mass	
	t	%	T	%
Oil refineries / Synthetic fuels	159 270	59	174 580	63
Gold mines	0	0	0	0
Copper mines	76 891	28	69 530	25
Zinc mines	0	0	0	0
PGM mines	34 012	13	32 908	12
	270 173	100	277 018	100

Source: DMR, Directorate Mineral Economics

Local sales mass of South Africa's sulphur in all forms (SAF) production increased by 17.3 percent from 133 kt in 2013 to 156 kt in 2014 (Table 106). The corresponding local sales value increased by 97.3 percent from R67.1 million in 2013 to R132.5 million in 2014 owing to an upward slope in demand. Export sales mass of SAF decreased by 9.2 percent to 128 kt in 2014 compared with 141 kt in 2013 (Table 106). Export sales value decreased by 7.7 percent to R213.7 million in 2014 compared with R231.6 million in 2013. The sulphur market is closely related to the fertilizer industry and it experienced storm in 2013 due to weak phosphate demand thus influencing values to drop severely. However, price per ton of sulphur sold on the export market has gone up slightly by 1 percent from R1647 Mt in 2013 to R1664 Mt in 2014 in response to producers reintroducing their control in the market and seeking to cover for the costs of production.

TABLE 106: SOUTH AFRICA'S PRODUCTION AND SALES OF SULPHUR IN ALL FORMS, 2004-2014

YEAR	PRODUCTION	LOCAL SALES			EXPORT SALES		
	Mass	Mass	Value		Mass	Value	
Kt	Kt	Kt	R'000	R/t	Kt	R'000	R/t
2004	633	390	201 706	517	69	47 677	692
2005	776	481	231 118	481	103	65 592	638
2006	643	351	181 450	517	124	77 919	630
2007	642	358	212 258	593	125	96 571	770
2008	571	315	548 705	1 740	110	351 860	3 190
2009	536	332	293 105	883	62	27 193	436
2010	375	256	168 911	660	96	48 795	511
2011	338	217	116 645	538	121	199 581	1 658
2012	257	150	123 405	821	125	241 351	1 924
2013	270	133	67 127	506	141	231 606	1 647
2014	277	156	132 463	847	128	213 742	1 664

Source: DMR, Directorate Mineral Economics

South Africa's imports mass of SAF decreased by 3.4 percent to 627 kt in 2014 compared with 649 kt in 2013 while the imports value increased 39.3 percent from 754 kt in 2013 to 1051 kt in 2014 (Table 107). South Africa imports sulphur mainly from Canada, United Arab Emirates, Saudi Arabia and Kuwait.

TABLE 107: SOUTH AFRICA'S IMPORTS OF SULPHUR, 2007 – 2014

YEAR	CRUDE/UNREFINED			SUBLIMED & OTHER[+]			TOTAL		
	Mass	Value (FOB)		Mass	Value (FOB)		Mass	Value (FOB)	
	Kt	R'000	R/t	Kt	R'000	R/t	Kt	R'000	R/t
2007	599	365 921	610	78	87 705	1 124	677	453 626	670
2008	791	3 436 560	4 344	173	754 037	4 358	964	4 190 597	4 347
2009	525	354 611	675	46	10 141	220	571	364 752	639
2010	593	377 801	637	63	51 396	816	656	429 197	654
2011	715	1 073 705	1 502	191	336 572	1 762	906	1 410 277	1 557
2012	506	843 456	1 667	94	124 605	1 326	600	968 061	1 613
2013	489	530 362	1 085	160	223 846	1 399	649	754 208	1 162
2014	537	866 566	1 614	894	183 964	206	627	1 050 530	1 675

Source: RSA, Commissioner for South African Revenue Service, 2007 – 2013
Notes: [+] All forms of sulphur other than those specifically referred to

PRICES

International sulphur prices are dependent on economic conditions or trends. Prices continued to fall due to poor demand and lower prices. Sulphur prices on other global markets were influenced by short-term contracts and product availability.

KEY DEVELOPMENTS

Sasol is an international integrated energy company with diverse chemical interests. It has three main areas of concentration: coal to liquid fuels technology, crude oil and natural gas to liquid fuels. Both Sasol the global economy are affected by the challenges of climate change, that being crude oil and natural gas prices, exchange rate and chemical prices. In combating these challenges, precautionary measures are taken by the company which include: the use of a combined forward exchange contracts and crude oil features in the National Petroleum and Refiners of South Africa (Natref) refining for the short-term, hedging both capital investments and currently foreign dominated imports by a way of forward exchange contracts, and in dealing with the commodity chemicals, investments are made in the value chain from raw materials to final products.

The National Development Plan (NDP) aims to improve the economy of the country through job creation, investments in education, improving healthcare, promoting skills and development, infrastructure development, alleviating poverty and inequality by 2030 through agricultural and mining projects. The South African government has redirected funds to focus on the role of agriculture to secure food in the country as well as the development of rural community. Modern agricultural activities depend on fertilizers and sulphur. Public investments in new agricultural technologies, particularly in physical capital stock (land, equipment, machinery, storage facilities and livestock) are underway. Equally so, the development of strong and environmentally sustainable policies and support services for small-scale and rural farmers to ensure the protection of rural livelihoods and the concurrent expansion of commercial agriculture, so that South Africa remains a net exporter of agricultural produce.

OUTLOOK

On an annual basis, the use of sulphur directly or in mixtures such as fertilizer, will likely continue to be dependent on agricultural economies and differ according to economic conditions. If an extensive use of plant nutrient sulphur is adopted, then sulphur consumption in that application may possibly increase significantly. Major expansions of phosphate fertilizer production are expected at facilities in China, Morocco, and Saudi Arabia.

In the near term increased international production and sustained demand will keep the sulphur market in balance, as the phosphate fertilizer projects are preparing for commissioning within the next five years, particularly in the Middle East, North Africa, Brazil and China.

The South African government has prioritised food security; therefore, strategies and programmes towards securing food are imperative. To meet the expected food demand growth, collective efforts including studies to demonstrate the strong linkage between mining and agriculture are underway and this will make significant contribution towards the sustainability of both sectors to secure food for South Africans, thus increasing the potential demand for sulphur.

REFERENCES

1. *Sulphur magazine, 2014-2015.*
2. *U.S. Geological Survey, Mineral Commodity Summaries, February 2014-2015*
3. *http://www.chemistryexplained.com*
4. *DMR, Directorate Mineral Economics*
5. *Lori, E., Apodaca, 2015, Sulphur Review, USGS [pdf]. Internet. http://www.usgs.gov*
6. *Patrick Heffer and Michel Prud'homme, 2013, Fertilizer outlook 2013–2017*
7. *Sulphur Information Service, http://sulfur.nigc.ir/en/sulfurtrade/sulfurmarket/marketstructure*
8. *World sulphur Program, SRI Consulting*
9. *Industrial Minerals Magazine, March 2015 and internet: www.indmin.com*
10. *Palaborwa Mining Company (PMC) Annual Report 2014 and Provincial Results*
11. *Prud'homme, Michel, 2013, Fertilizers and raw materials global supply 2013–2017 in IFA Annual Conference: International Fertilizer Industry*
12. *Sasol Annual Report 2014*
13. *National Development Plan, Vision 2030*
14. *Patrick Heffer and Michel Prud'homme, 2014, IFA, Fertiliser Outlook 2015-2019*
15. *Fertilizer International Magazine, 2014-2015*
16. *South African Revenue Services (SARS)*

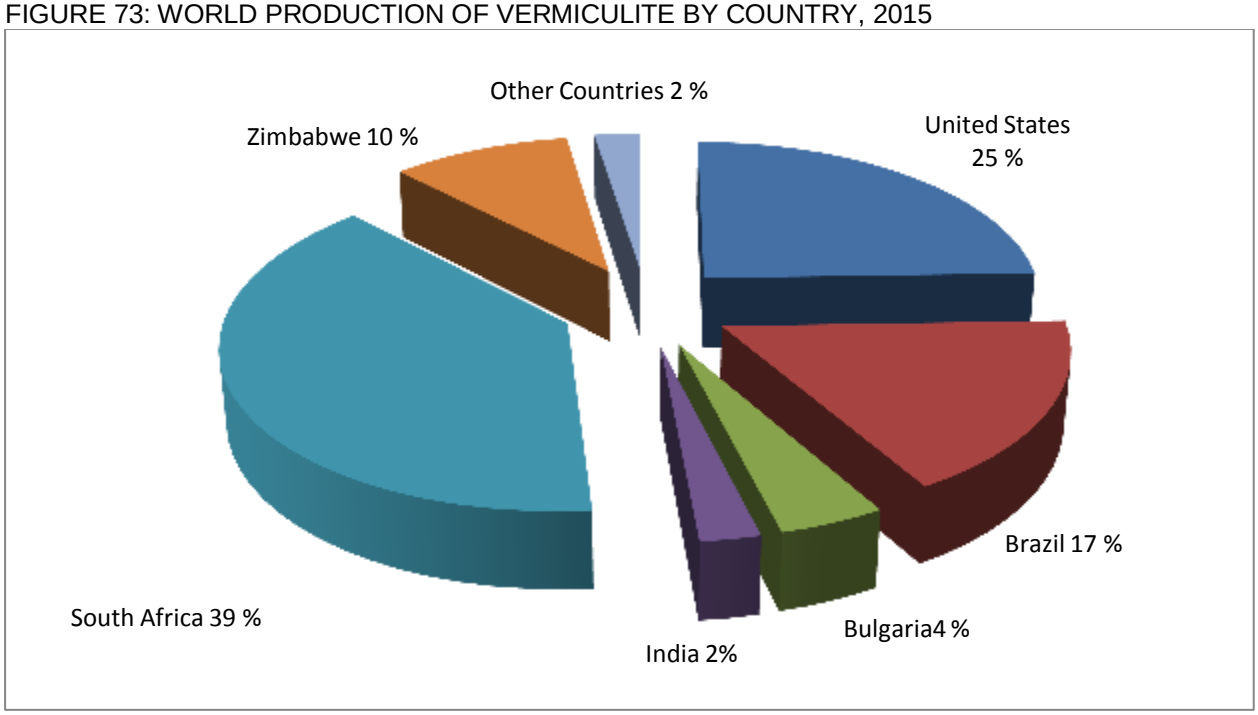
VERMICULITE

M Muravha

SUPPLY AND DEMAND

World vermiculite production is estimated to have increased by 7.1 percent from 381 kt to 408 kt in 2015 as a result of expansion projects from countries like Russia, Turkey and Uganda which have resulted in oversupply in the industry for medium to finer grades in the world market.

FIGURE 73: WORLD PRODUCTION OF VERMICULITE BY COUNTRY, 2015



Source: USGS, 2016

South Africa remained the world's largest producer of vermiculite contributing about 39 percent to total world production, followed by USA at 25 percent, Brazil at 17 percent and Zimbabwe at 10 percent, the latter having taken over this position from China (contributed 12 percent in 2014). (Figure 73).

Palabora Mining Company (PMC) is the world's largest producer of vermiculite and South Africa's sole vermiculite producer. PMC's production of vermiculite decreased by 3.3 percent to 138.3 kt in 2015 compared with 143.0 kt in 2014 (Table 108). The company increased its targets in 2014 in line with increasing demand from consumers and does so whenever these adjustments are necessary.

Tonnages sold locally increased by 0.8 percent to 9.3 kt in 2015 compared with 9.2 kt in 2014, while local sales values increased by 6.2 percent to R20.2 million in the same period, due to strong demand from agriculture and horticulture sectors. Export volumes decreased by 20.3 percent from 144.3 kt to 115.1 kt in 2015, while export sales values decreased by 13.5 percent from R461.9 million to R399.5 million. Export unit prices increased by 8.4 percent from R 3 200 to R 3 470. Unit prices in 2015 were slightly higher as a result of coarser grade sales that are more expensive than finer grades.

TABLE 108: SOUTH AFRICA'S PRODUCTION, LOCAL SALES AND EXPORTS OF VERMICULITE, 2004 – 2015

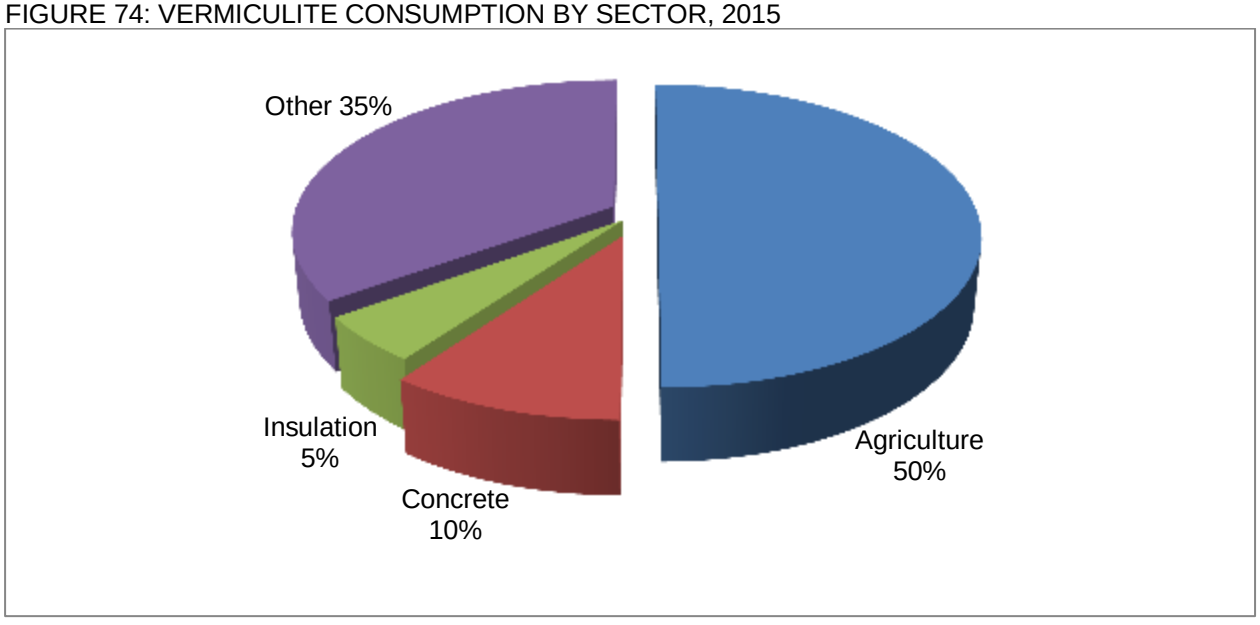
YEAR	PRODUCTION	LOCAL SALES			EXPORTS SALES		
	Mass	Mass	Value (FOR)		Mass	Value (FOB)	
	kt	kt	R'000	R/t	kt	R'000	R/t
2004	196.9	7.3	6 229	855	178.8	150 944	844
2005	209.9	6.9	6 368	923	163.7	188 402	1 151
2006	197.8	7.6	7 087	927	166.7	170 029	1 056
2007	198.5	9.1	8 896	981	173.2	195 577	1 129
2008	199.8	10.7	11 002	1 026	204.5	273 239	1 336
2009	193.3	9.5	10 236	1 073	164.6	238 295	1 448
2010	199.3	10.4	12 927	1 241	166.5	216 305	1 299
2011	167.5	9.6	16 576	1 722	162.4	328 921	2 215
2012	132.8	7.5	15 692	2 102	96.5	279 696	2 898
2013	127.7	8.6	17 861	2 088	118.3	380 489	3 215
2014	143.0	9.2	19 027	2 055	144.4	461 928	3 200
2015	138.3	9.3	20 212	2 164	115.1	399 547	3 470

Source: DMR, Directorate Mineral Economics

About 80 percent of vermiculite sold to local consumers in South Africa is used in horticulture and agriculture, where its application is in soil moisture retention and hosting a number of mineral fertilisers such as ammonium, potassium, calcium and magnesium. The balance is then used in construction and insulation sectors. Population growth, change in lifestyle and increasing consumer preferences towards healthy products are driving horticulture market up. In 2015, the country experienced drought that compelled farmers to use measure such as soil treatment with vermiculite in order to mitigate the effects of a devastating drought.

Globally horticulture accounted for 50 percent of vermiculite consumption followed by light weight concrete at 10 percent and insulation applications at 5 percent (Figure 74). Vermiculite has a potential of growth into other applications such as, animal feed, fire protection materials and acting as a good substitute for asbestos. However, vermiculite is also facing a challenge of increase of a number of substitute products in the market, such as expanded perlite, shale, clay and slag. Despite the threat of all these substitutes the world production still increased by 7.1 percent in 2015, indicating the inclined position of the market toward vermiculite.

FIGURE 74: VERMICULITE CONSUMPTION BY SECTOR, 2015



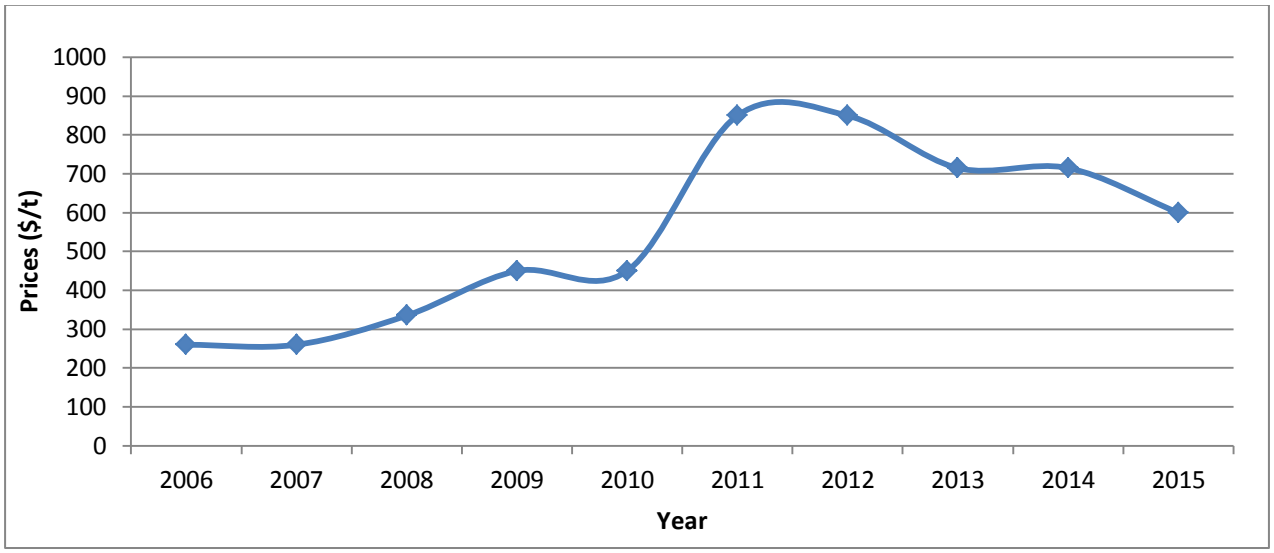
Source: USGS Commodity Summaries 2016

Europe remains the main market for South African's vermiculite whilst North America and Asia show, big growth potential for future consumption.

PRICES

In 2014, concentrate (bulk, FOB Antwerp) prices decreased from $315-715/t to $320-600 in December 2015, owing to oversupply of fine grades in the industry. The cost of mining vermiculite continues to increase and has become one of the biggest challenges that operations face. Despite these increase in operational costs, bulk concentrate prices decreased reasonably (Figure 75).

FIGURE 75: VERMICULITE PRICES, 2006-2015



Source: Various editions of Industrial Minerals Magazine

KEY DEVELOPMENTS

Since the sale of Palabora Mining Company (PMC) in 2014 to a consortium comprised of South African and Chinese companies, production at PMC was about 200 kt/annum. However, the company has plans to expand its production to meet future world demand.

An Australian company transferred full ownership of its East African Namekara vermiculite mine in Uganda to its financial lenders, freeing it of all debt. The mine remained on care-and-maintenance status, mostly as a result of an oversupply of the medium-to-finer grades in the world market and sluggish market conditions in Europe (its largest market). The Namekara deposit has sufficient resources for more than 50 years of production and is a portion of the larger East African vermiculite project, which has about 55 million tons of inferred resources and is considered to be one of the world's largest deposits.

A Brazillian company, continued to expand production capacity at its vermiculite mine in central Brazil and to develop another deposit near Brasilia. The new operation, which was scheduled to commence operation in 2016, will bring the company's total production capacity to 200,000 tons per year. Another company in Russia mined vermiculite in the Murmansk Region of northwest Russia and marketed its vermiculite concentrate and exfoliated vermiculite mostly in Russia, as well as in Eastern Europe and Western Europe.

OUTLOOK

PMC's production is expected to increase in 2016 at the back of the anticipated demand from the horticulture/agriculture markets. Also, climate change and future availability of water are likely to drive vermiculite consumption, owing to its water retention characteristics. South Africa's construction industry is expected to continue expanding until 2020 driven by investment in infrastructure, residential and energy project. As construction activities grow demand for vermiculite will follow suit.

World supply of vermiculite is expected to increase on the back of companies expanding their operations to ramp up capacity. Amongst many other companies that are already busy with expansion plans, Brasil

Minerios of Brazil aims to expand its production capacity to 200 kt pa in 2016, while Uganda Gulf Industrials is planning to increase its capacity to 50 kt pa in 2015. Consumers demand for coarser grains is on the rise while producers strive to produce the required grades. Vermiculite prices are expected to decrease further as coarse grain supply stabilizes.

REFERENCES

1. *Department of Mineral Resources, Directorate Mineral Economics*
2. *Industrial Minerals, 2016.*
3. *Merchant Research and Consulting: Perlite and Vermiculite: Global Market Review 2015/2016*
4. *Palabora Mining Company annual report, personal communication*
5. *USGS commodity summaries, 2016*

STATISTICS FOR OTHER INDUSTRIAL MINERALS

R Motsie

NOTE: The following applies to all tables.
** Withheld for reasons of company confidentiality
* Nil

1. NATURAL ABRASIVES

TABLE 109: SOUTH AFRICA'S IMPORTS OF NATURAL ABRASIVES, 2005–2014

YEAR	Mass	Value (FOB)	
	t	R'000	R/t
2005	1 706	3 610	2 112
2006	1 311	4 888	3 728
2007	1 282	6 095	4 654
2008	1 183	5 198	4 394
2009	1 208	7 419	6 141
2010	1 919	6 837	3 563
2011	2 095	6 393	3 051
2012	2 251	7 152	3 177
2012	2 251	7 152	3 177
2013	2 088	8 239	3 946
2014	996	5 398	5 421

Source: RSA, Commissioner for South African Revenue Service, 2005–2014

2. BARYTES

TABLE 110.1: SOUTH AFRICA'S PRODUCTION AND LOCAL SALES OF BARYTES, 2005–2014

YEAR	PRODUCTION	LOCAL SALES		
	Mass	Mass	Value (FOR)	
	t	t	R'000	R/t
2005	*	146	61	418
2006	*	126	52	413
2007	*	535	225	421
2008	*	432	181	419
2009	*	284	119	419
2010	*	319	134	420
2011	*	189	79	420
2012	*	*	*	*
2013	*	*	*	*
2014	**	**	**	**

Source: DMR, Directorate Mineral Economics

TABLE 110.2: SOUTH AFRICA'S IMPORTS OF BARYTES, 2005–2014

YEAR	Mass	Value (FOB)	
	t	R'000	R/t
2005	2 013	7 748	3 849
2006	2 736	7 908	2 890
2007	3 114	14 921	4 792
2008	3 568	14 106	3 953
2009	2 823	13 805	4 890
2010	4 105	17 200	4 190
2011	3 146	11 747	3 740
2012	2 962	11 469	3 872
2013	3 128	10 195	3 259
2014	5 699	18 804	3 299

Source: RSA, Commissioner for South African Revenue Service, 2005–2014

3. DIATOMACEOUS EARTH (KIESELGUHR)

TABLE 111: SOUTH AFRICA'S IMPORTS OF DIATOMACEOUS EARTH, 2005–2014

YEAR	Mass	Value (FOB)	
	t	R'000	R/t
2005	5 318	12 944	2 434
2006	5 032	14 321	2 846
2007	4 828	18 930	3 921
2008	5 539	23 205	4 189
2009	3 930	16 075	4 090
2010	4 580	17 496	3 820
2011	5 261	19 572	3 720
2012	5 217	19 970	3 828
2013	4 016	18 940	4 716
2014	4 541	26 419	5 818

Source: RSA, Commissioner for South African Revenue Service, 2005–2014
Note: Production statistics are not published because there is only one producer

4. FELDSPAR

TABLE 112: SOUTH AFRICA'S PRODUCTION, LOCAL SALES AND EXPORTS OF FELDSPAR, 2005–2014

YEAR	PRODUCTION	LOCAL SALES			EXPORT SALES+		
		Mass	Value (FOR)		Mass	Value (FOB)	
	kt	kt	R'000	R/t	kt	R'000	R/t
2005	57.5	75.2	44 256	588	*	*	*
2006	75.4	85.2	54 649	641	0.2	218	903
2007	90.2	106.8	62 080	581	*	*	*
2008	105.8	70.1	49 260	702	*	*	*
2009	101.4	72.9	55 248	758	*	*	*
2010	94.3	69.9	56 204	804	*	*	*
2011	101.6	98.9	61 031	617	*	*	*
2012	94.5	92.9	45 899	494	*	*	*
2013	191.4	186.5	101 444	544	*	*	*
2014	102.5	99.9	52 134	522	*	*	*

Source: DMR, Directorate Mineral Economics

5. GRAPHITE

TABLE 113: SOUTH AFRICA'S IMPORTS OF NATURAL GRAPHITE, 2005–2014

YEAR	Mass	Value (FOB)	
	t	R'000	R/t
2005	1 270	3 909	3 078
2006	1 220	5 193	4 257
2007	1 008	8 207	8 142
2008	1 003	20 101	20 041
2009	921	8 657	9 400
2010	1 108	12 891	11 634
2011	1 099	54 29	49 390
2012	768	10 372	13 505
2013	704	8 390	11 925
2014	603	9 208	15 270

Source: RSA, Commissioner for South African Revenue Service, 2005–2014

6. GYPSUM

TABLE 114.1: SOUTH AFRICA'S PRODUCTION, LOCAL SALES, AND CONSUMPTION OF NATURAL GYPSUM, 2005–2014

YEAR	PRODUCTION	LOCAL SALES			CONSUMPTION
		Mass	Value (FOR)		FOR CEMENT[+#]
	kt	kt	R'000	R/t	kt
2005	547	503	18 690	37	500
2006	557	370	30 605	83	550
2007	627	388	33 517	86	543
2008	571	393	33 666	86	519
2009	598	397	36 616	92	***
2010	513	307	32 228	105	***
2011	476	323	36 831	114	***
2012	558	358	56 876	159	***
2013	559	327	58 288	178	***
2014	376	290	52 580	181	***

Sources: DMR, Directorate Mineral Economics
Notes: [+] Based on cement sales and assuming 38,5t gypsum/1 000t cement.
[#] Includes synthetic gypsum.
**** Not available*

TABLE 114.2: SOUTH AFRICA'S IMPORTS OF GYPSUM AND GYPSUM PLASTERS, 2005–2014

YEAR	GYPSUM			GYPSUM PLASTERS		
	Mass	Value (FOB)		Mass	Value (FOB)	
	T	R'000	R/t	t	R'000	R/t
2005	1 971	2 218	1 125	4 268	5 704	1 337
2006	2 408	3 703	1 537	5 313	8 827	1 661
2007	3 007	4 555	1 515	17 205	15 004	872
2008	1 939	3 343	1 724	11 290	14 303	1 267
2009	3 427	8 379	2 445	3 790	8 200	2 164
2010	24 506	7 884	321	6 386	10 903	1 707
2011	2 969	4 816	1 622	6 181	10 926	1 678
2012	10 957	10 015	9 141	7 407	12 775	1 725
2013	4 058	12 321	3 036	7 685	16 493	2 146
2014	66 261	28 971	437	7 597	18 219	2 398

Source: RSA, Commissioner for South African Revenue Service, 2005–2014

7. MAGNESITE

TABLE 115.1: SOUTH AFRICA'S PRODUCTION AND LOCAL SALES OF MAGNESITE AND DERIVED PRODUCTS, 2005–2014

YEAR	PRODUCTION	LOCAL SALES		
		Mass	Value (FOR)	
	kt	Kt	R'000	R/t
2005	54.8	103.4	31 327	303
2006	73.3	110.8	35 104	317
2007	80.7	117.4	42 323	360
2008	83.9	111.1	51 864	467
2009	47.6	72.3	43 234	598
2010	27.7	73.6	63 982	869
2011	**	**	**	**
2012	**	**	**	**
2013	**	**	**	**
2014	**	**	**	**

Source: DMR, Directorate Mineral Economics

TABLE 115.2: SOUTH AFRICA'S IMPORTS OF MAGNESITE AND MAGNESIA, 2005–2014

	MAGNESITE			MAGNESIA		
YEAR	Mass	Value (FOB)		Mass	Value (FOB)	
	kt	R'000	R /t	kt	R'000	R/t
2005	13.4	24 599	1 840	38.6	58 729	1 521
2006	11.2	15 444	1 379	36.2	61 115	1 688
2007	24.9	51 790	2 080	48.0	91 115	1 898
2008	15.3	39 509	2 582	36.2	136 071	3 759
2009	25.5	10 850	4 254	41.8	139 175	3 328
2010	12.3	10 389	844.6	65.7	205 594	3 129
2011	10.4	14 709	1 410	96.2	324 992	3 376
2012	11.3	22 555	1 996	50.6	185 019	3 655
2013	21.8	37 277	1 710	54.6	230 046	4 208
2014	11 2	34 527	3 094	44.8	229 975	5 124

Source: RSA, Commissioner for South African Revenue Service, 2005–2014

8. MICA

TABLE 116.1: SOUTH AFRICA'S PRODUCTION, LOCAL SALES AND EXPORTS OF SCRAP AND FLAKE
MICA, 2005–2014

YEAR	PRODUCTION	LOCAL SALES			EXPORT SALES		
		Mass	Value (FOR)		Mass	Value (FOB)	
	t	t	R'000	R/t	t	R'000	R/t
2005	922	*	*	*	856	**	**
2006	828	254	1 136.7	4 480	327	2 070.0	6 331
2007	437	201	870 727	4 329	261	1 679.8	6 428
2008	426	179	**	**	232	**	**
2009	299	245	**	**	106	**	**
2010	904	794	**	**	25	**	**
2011	633	431	**	**	174	**	**
2012	400	185	**	**	195	**	**
2013	309	113	**	**	*	*	*
2014	83	*	*	*	*	*	*

Source: DMR, Directorate Mineral Economics

TABLE 116.2: SOUTH AFRICA'S IMPORTS OF MICA, 2005–2014

YEAR	Mass	Value (FOB)	
	t	R'000	R/t
2005	581	1 073	1 847
2006	901	1 365	1 515
2007	865	1 667	1 928
2008	296	1 103	3 727
2009	358	933	2 608
2010	483	1 152	2 385
2011	507	1 353	2 668
2012	425	1 353	3 184
2013	633	2 997	4 524
2014	862	3 853	4 471

Source: RSA, Commissioner for South African Revenue Service, 2004–2013

9. MINERAL PIGMENTS

TABLE 117: SOUTH AFRICA'S PRODUCTION AND SALES OF MINERAL PIGMENTS, 2005–2014

YEAR	PRODUCTION	LOCAL SALES			EXPORT SALES		
		Mass	Value		Mass	Value	
	t	t	R'000	R/t	t	R'000	R/t
2005	510	801	554	692	226	472	2 091
2006	590	811	751	927	*	*	*
2007	232	737	769	1 043	*	*	*
2008	39	288	94	327	*	*	*
2009	183	119	40	339	*	*	*
2010	244	66	22	340	*	*	*
2011	226	19	7.6	400	*	*	*
2012	*	*	*	*	*	*	*
2013	*	*	*	*	*	*	*
2014	*	*	*	*	*	*	*

Source: DMR, Directorate Mineral Economics

10. POTASH

TABLE 118: SOUTH AFRICA'S IMPORTS OF POTASH, 2005–2014

YEAR	POTASSIUM CHLORIDE		POTASSIUM SULPHATE		POTASSIUM NITRATE		TOTAL	
	kt	R'000	kt	R'000	kt	R'000	kt	R'000
2005	198.3	241 859	39.0	58 400	30.1	85 496	267.4	385 755
2006	260.4	381 811	40.2	79 892	20.6	79 737	321.2	541 440
2007	255.4	409 632	38.8	93 446	26.0	79 083	320.2	582 181
2008	271.4	1 546 452	46.1	330 639	26.2	281 162	343.7	2 158 253
2009	139.6	618 360	24.0	129 297	14.8	101 451	178.4	849 108
2010	267.4	697 166	46.2	159 251	23.6	106 461	337.2	962 878
2011	265.1	867 674	52.6	219 149	27.8	170 730	345.5	1 257 553
2012	249.4	978 958	60.7	305 573	43.0	266 741	353.1	1 551 272
2013	274.1	1 209 391	50.5	253 304	23.0	189 429	347.5	1 652 124
2014	381.5	1 333 954	65.3	470 162	57.0	491 960	503.8	2 295 277

Source: RSA, Commissioner for South African Revenue Service, 2005–2014
Note: Up to 10 percent of the imports were most likely for non-fertiliser uses

11. PYROPHYLLITE

TABLE 119: SOUTH AFRICA'S PRODUCTION, LOCAL SALES AND EXPORTS OF PYROPHYLLITE, 2005–2014

YEAR	PRODUCTION	LOCAL SALES			EXPORT SALES		
		Mass	Value (FOR)		Mass	Value (FOB)	
	t	t	R'000	R/t	t	R'000	R/t
2005	**	**	34 798	**	**	6 038	**
2006	**	**	34 576	**	**	52 879	**
2007	**	**	39 962	**	**	7 483	**
2008	**	**	42 230	**	**	8 438	**
2009	**	**	38 449	**	**	9 795	**
2010	**	**	49 566	**	**	16 762	**
2011	**	**	31 277	**	**	201 423	**
2012	**	**	7 511	**	**	4 585	**
2013	**	**	5 750	**	**	4 944	**
2014	**	**	4 910	**	**	18 448	**

Source: DMR, Directorate Mineral Economics

12. SALT

TABLE 120: SOUTH AFRICA'S PRODUCTION, LOCAL SALES AND EXPORTS OF SALT, 2005–2014

YEAR	PRODUCTION	LOCAL SALES			EXPORTS		
		Mass	Value (FOR)		Mass	Value (FOB)	
	kt	kt	R'000	R/t	kt	R'000	R/t
2005	399	436	79 306	182	*	*	*
2006	405	425	89 583	211	*	*	*
2007	411	450	101 951	227	*	*	*
2008	430	437	123 537	282	*	*	*
2009	408	438	104 309	321	*	*	*
2010	394	423	126 306	298	*	*	*
2011	380	440	139 829	318	*	*	*
2012	399	480	155 293	324	*	*	*
2013	479	480	154 465	322	*	*	*
2014	494	492	160 695	326	*	*	*

Source: DMR, Directorate Mineral Economics

13. SILICA

TABLE 121.1: SOUTH AFRICA'S PRODUCTION, LOCAL SALES AND EXPORTS OF SILICA, 2005–2014

YEAR	PRODUCTION	LOCAL SALES			EXPORT SALES		
		Mass	Value (FOR)		Mass	Value (FOB)	
	kt	kt	R'000	R/t	t	R'000	R/t
2005	2 671	2 290	189 469	83	652	1 017	1 560
2006	3 231	2 884	236 296	82	424	896	2 113
2007	3 352	2 726	280 191	103	806	1 541	1 913
2008	3 342	3 059	351 474	115	959	1 486	1 550
2009	2 306	2 431	330 404	136	1 222	1 652	1 352
2010	2 863	3 026	470 618	155	1 042	1 632	1 567
2011	2 688	3 008	487 779	162	3 843	5 127	1 334
2012	2 151	2 356	543 599	205	18 821	334 899	17 94
2013	2 198	2 428	458 457	189	10 789	28 384	2 631
2014							

Source: DMR, Directorate Mineral Economics

14. TALC

TABLE 122.1: SOUTH AFRICA'S PRODUCTION AND SALES OF TALC, 2005–2014

YEAR	PRODUCTION	LOCAL SALES			EXPORT SALES		
		Mass	Value (FOR)		Mass	Value (FOB)	
	t	t	R'000	R/t	t	R'000	R/t
2005	8 469	7 439	4 319	581	*	*	*
2006	10 966	7 134	4 957	695	*	*	*
2007	14 281	7 326	5 639	770	*	*	*
2008	5 145	6 591	5 606	851	*	*	*
2009	4 718	6 213	5 893	948	*	*	*
2010	3 150	5 370	5 573	1 038	*	*	*
2011	4 453	5 489	6 050	1 102	*	*	*
2012	4 765	5 568	7 084	1 272	*	*	*
2013	4 924	7 117	8 806	1 237	*	*	*
2014	4 827	5 606	8 297	1 480	*	*	*

Source: DMR, Directorate Mineral Economics

TABLE 122.2: SOUTH AFRICA'S IMPORTS OF TALC, 2005–2014

YEAR	Mass	Value (FOB)	
	t	R'000	R/t
2005	10 541	17 713	1 694
2006	9 565	20 344	2 127
2007	11 721	26 040	2 222
2008	8 142	25 114	3 084
2009	10 254	23 851	2 326
2010	9 818	26 908	2 741
2011	7 126	28 015	3 931
2012	7 696	27 556	3 581
2013	8 182	33 408	4 083
2014	9 096	43 500	4 782

Source: RSA, Commissioner for South African Revenue Service, 2004–2013

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Department of Water Affairs
Private Bag X 313 www.dwaf.co.za
0001 Pretoria

Sedibeng Building
185 Francis Baard Street
Pretoria

Tel: +27 (0) 12 336 7500 / 6696
Fax: +27 (0) 12 326 2715 / 336 8850
+27 (0) 12 324 6592

Statistics South Africa
Private Bag X 44 www.statssa.gov.za
0001, Pretoria

De Bruyn Park
170 Thabo Sehume Street
Pretoria

Tel: +27 (0) 12 310 8911 / 8600
Fax: +27 (0) 12 310 8500 / 8944

STATE OWNED ENTERPRISES

Council for Geoscience
Private Bag X 112 www.geoscience.org.za
0001 Pretoria

280 Pretoria Road
Silverton
Pretoria

Tel: +27 (0) 12 841 1911
Telefax: +27 (0) 12 841 1221

CSIR
PO Box 395 www.csir.co.za
0001 Pretoria

Meiring Naude Road
Brummeria
Pretoria

Tel: +27 (0) 12 841 2911
Telefax: +27 (0) 12 349 1153

CSIR – Mining Technology (Miningtek)
PO Box 91230 www.csir.co.za/miningtek
2006 Auckland Park

cnr Carlow & Rustenburg Avenue
Mellville
Johannesburg

Tel: +27 (0) 11 358 0000
Telefax: +27 (0) 11 726 5405

Eskom
PO Box 1091 www.eskom.co.za
2000 Johannesburg

Megawatt Park
Maxwell Drive
Sunninghill Ext 3
Sandton

Tel: +27 (0) 11 800 8111
Telefax: +27 (0) 11 800 4299

Mine Health and Safety Council
Private Bag X 63 www.mhsc.org.za
Braamfontein
2017

Woodmead Business Park
145 Western Service Road
Maple North Building
Woodmead

Tel: +27 (0) 11 656 1797
Fax: +27 (0) 11 656 1796

Mining Qualifications Authority
Private Bag X 118 www.mqa.org.za
Marshalltown
2107

7 Annerley Road
Parktown
Johannesburg

Tel: +27 (0) 11 547 2600
Fax: +27 (0) 11 832 1027

Mintek
Private Bag X 3015 www.mintek.co.za
2125 Randburg

200 Malibongwe Drive
Randburg

Tel: +27 (0) 11 709 4111
Telefax: +27 (0) 11 793 2413

Petro SA
Private Bag X5 www.petrosa.co.za
Parow, Cape Town
7499

151 Frans Conradie Drive
Cape Town 7500

Tel: +27 (0) 21 929 3000
Telefax: +27 (0) 21 929 3144

NECSA
PO Box 582 www.necsa.co.za
0001 Pretoria

Elias Motswaledi Street, West Extension
Pelindaba, Brits District

Tel: +27 (0) 12 305 4911
Telefax: +27 (0) 12 305 3111

South African Agency for Promotion of
Petroleum Exploration and Exploitation (Pty) Ltd
Petroleum Agency SA
PO Box 5111 www.petroleumagencysa.com
Tygervalley
7536

Tygerpoort Building
7 Mispel Street
Bellville 7530

Tel: +27 (0) 21 938 3500
Fax: +27 (0) 21 938 3520

The Industrial Development Corporation of SA Ltd
(IDC) www.idc.co.za
PO Box 784055
2146 Sandton

19 Fredman Drive
Sandton

Tel: +27 (0) 11 269 3000
Telefax: +27 (0) 11 269 3116

South African Diamond and
Precious Metals Regulator www.sadpmr.co.za
PO Box 16001
2028 Doornfontein

5th Floor, Office 501
S A Diamond Centre
Corner Main and Phillip Str
Johannesburg

Tel: +27 (0) 11 223 7043 / 7000
Telefax: +27 (0) 11 334 8898 / 8980

National Nuclear Regulator
PO Box 7106 www.nnr.co.za
0046 Centurion

Eco Glades Office Park,
Eco Glades 2 Block G
Witch Hazel Avenue
Highveld Ext 75
Eco Park
Centurion

Tel: +27 (0) 12 674 7100
Telefax: +27 (0) 12 663 5513

State Diamond Trader
PO Box 61212 www.statediamondtrader.gov.za
Marshalltown
2107

Suite 510, 5th Floor
SA Diamond Centre
225 Main Street
Johannesburg

Tel: +27 (0) 11 334 2691
Telefax: +27 (0) 11 334 1540

OTHER MINERAL-RELATED ORGANISATIONS

Aggregate and Sand Producers Association of
South Africa (ASPASA) www.aspasa.co.za
PO Box 1983
2107 Ruimsig

Unit 8
Coram Office Park
Ferero Road
Randpark Ridge

Tel: +27 (0) 11 791 3327
Telefax: +27 (0) 86 647 7967

Chamber of Mines of South Africa
PO Box 61809 www.chamberofmines.org.za
2107 Marshalltown

5 Hollard Street
Marshalltown
Johannesburg

Tel: +27 (0) 11 498 7100
Telefax: +27 (0) 11 498 1884

Copper Development Association (Pty) Ltd
PO Box 14785 www.copper.co.za
1422 Wadeville

53 Rendell Road
Wadeville
Germiston

Tel: +27 (0) 11 824 3712
Telefax: +27 (0) 11 824 3120

Federation of SA Gem & Mineralogical Societies
PO Box 17273 www.fosagams.co.za
0027 Groenkloof

584 Dune Street
Elarduspark
0181 Pretoria

Tel: +27 (0) 86 677 4001

Ferro Alloy Producers Association (FAPA)
PO Box 1338 www.seissa.co.za
2000 Johannesburg

Metal Industries House
42 Anderson Street
Johannesburg

Tel: +27 (0) 11 298 9400
Telefax: +27 (0) 11 298 9500

South African Mining Development Association (SAMDA)
PO Box 2057 www.samda.co.za
2121 Parklands

The Riviera
Ground Floor Block 3
606 Oxford Road corner North Ave
Riviera, Parktown

Tel: +27 (0) 11 486 0510
Telefax: +27 (0) 11 486 1394

Steel and Engineering Industries Federation of SA (Seifsa)
PO Box 1338 www.seifsa.co.za
2000 Johannesburg

Metal Industries House
42 Anderson Street
Johannesburg

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The Institute of Mine Surveyors of SA
PO Box 62339 www.ims.org.za
2107 Marshalltown

Chamber of Mines Building, Room 509
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The South African Institute of Mining and Metallurgy
PO Box 61127 www.saimm.co.za
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