

DEVELOPMENTS IN SOUTH AFRICA'S COAL INDUSTRY, 2006 - 2010

DIRECTORATE: MINERAL ECONOMICS



A coal stockpile in Richards Bay, KZN



**mineral resources**

Department:  
Mineral Resources  
**REPUBLIC OF SOUTH AFRICA**

REPORT R97/2012

# DEVELOPMENTS IN SOUTH AFRICA'S COAL INDUSTRY, 2006 -2010

DIRECTORATE: MINERAL ECONOMICS

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**ISBN: 978-0-621-41529-2**

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## LIST OF ABBREVIATIONS

BECSA	BHP Billiton Coal South Africa
BEE	Black Economic Empowerment
CAGR	Cumulative Annual Growth Rate
CBM	Coalbed Methane
CCS	Carbon Capture and Storage
CCT	Clean Coal Technologies
CGS	Council for Geosciences
CITT	Coal Industry Task Team
CoAL	Coal of Africa Limited
COP	Conference of Parties
DWA	Department of Water Affairs
ETS	Emission Trading Schemes
GHG	Green House Gases
IEA	International Energy Agency
km	Kilometer
KZN	Kwazulu-Natal
MCWAP	Mokolo Crocodile (West) Water Augmentation Project
Mt	Million tonnes
Mtpa	Million tonnes per annum
NPC	National Planning Commission
PASA	Petroleum Agency of South Africa
PPSIP	Presidential Projects Integrated Programme
RBCT	Richards Bay Coal Terminal
ROM	Run-of-mine
SACCCS	South African Centre for Carbon Capture and Storage
SACI	South African Coal Industry
SACRM	South African Coal Roadmap
tcf	Trillion Cubic Feet
UCG	Underground Coal Gasification
UNFCCC	United Nations Framework Convention on Climate Change
USA	United States of America

## **1. INTRODUCTION**

In 2010, coal global reserves were estimated at 860 930 Million tonnes (Mt) and 7 273 Mt of coal was produced. At current production levels and proven coal reserves, it is estimated that global coal mining will continue for the next 118 years <sup>[1]</sup>. Coal is one of the major sources used to meet global energy needs, providing approximately 30 percent of global primary energy needs and generates 42 percent of the world's electricity. Global demand for coal has grown steadily over the past 30 years, but has increased more rapidly in recent years to meet Asia's vast development, especially in China, India and also in the United States of America (USA).

The electricity and steel sectors are the two major drivers of global demand for coal. Other drivers include cement manufacturing, coal-to-liquids and coal-to-gas processes, generation of process heat in various industrial processes, chemical and pharmaceutical industries and specialized products such as carbon fibre. Going into the future coal demand will be driven largely by increased demand for access to electricity, industrialization and urbanization. According to the International Energy Agency (IEA), coal remains a crucial component of the world primary energy mix under any of the IEA scenarios.

Coal is South Africa's largest economically recoverable energy resource, which is also among the country's largest sources of foreign exchange earnings. The South African Coal Industry (SACI) employs about 15 percent of the country's mining industry workforce of about 520 000. Coal provides over 70 percent of South Africa's primary energy, while 95 percent of the country's electricity is coal-fired and 30 percent of the liquid fuels are generated from Sasol's coal-to-liquid technology.

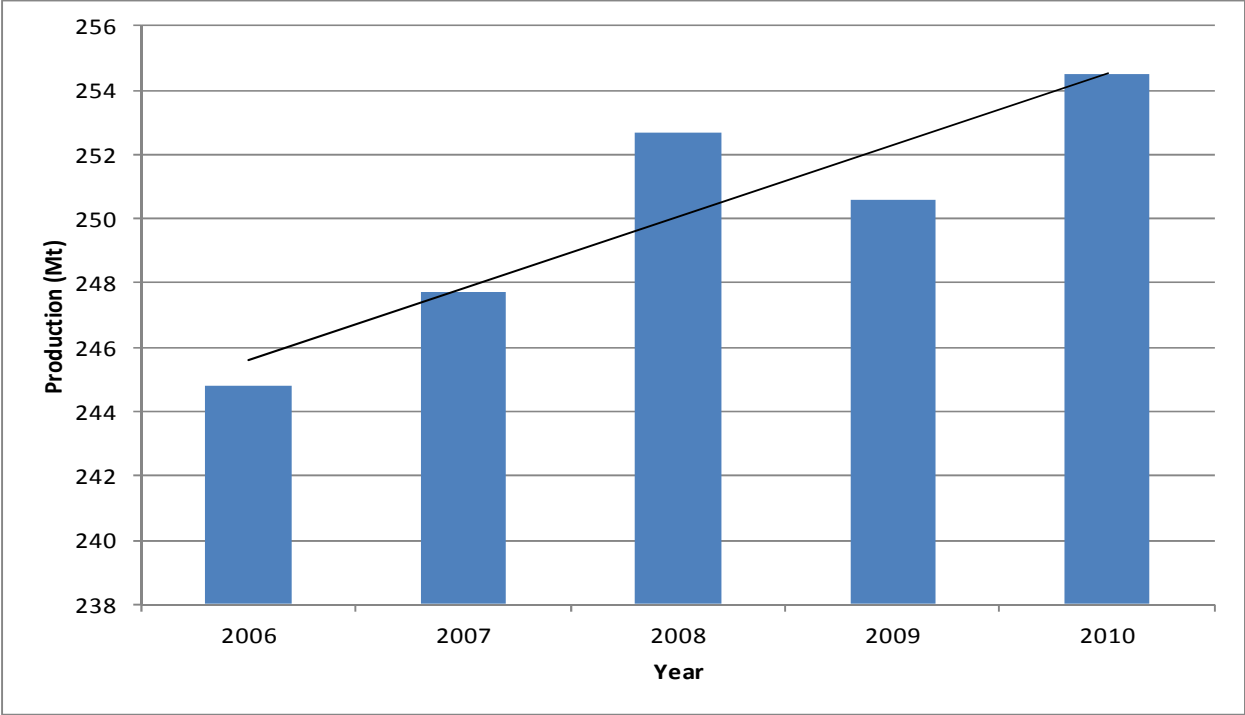
## **2. DEVELOPMENTS IN THE SOUTH AFRICAN COAL INDUSTRY**

### **2.1 Production**

South Africa's coal production increased by a cumulative annual growth rate (CAGR) of 0.98 percent from 244.8 Mt in 2006 to 254.5 Mt in 2010 (Figure 1). Coal production was dominated by six large mining houses, including Anglocoal, Exxaro, Sasol Mining, BHP Billiton Coal South Africa (BECSA), Xstrata and Optimum Coal. Together these mining houses accounted for about 82 percent of the country's total production and the remainder is produced by junior coal miners and black economic empowerment (BEE) companies.



FIGURE 1: SOUTH AFRICA'S COAL PRODUCTION, 2006 TO 2010



Source: DMR, Mineral Economics

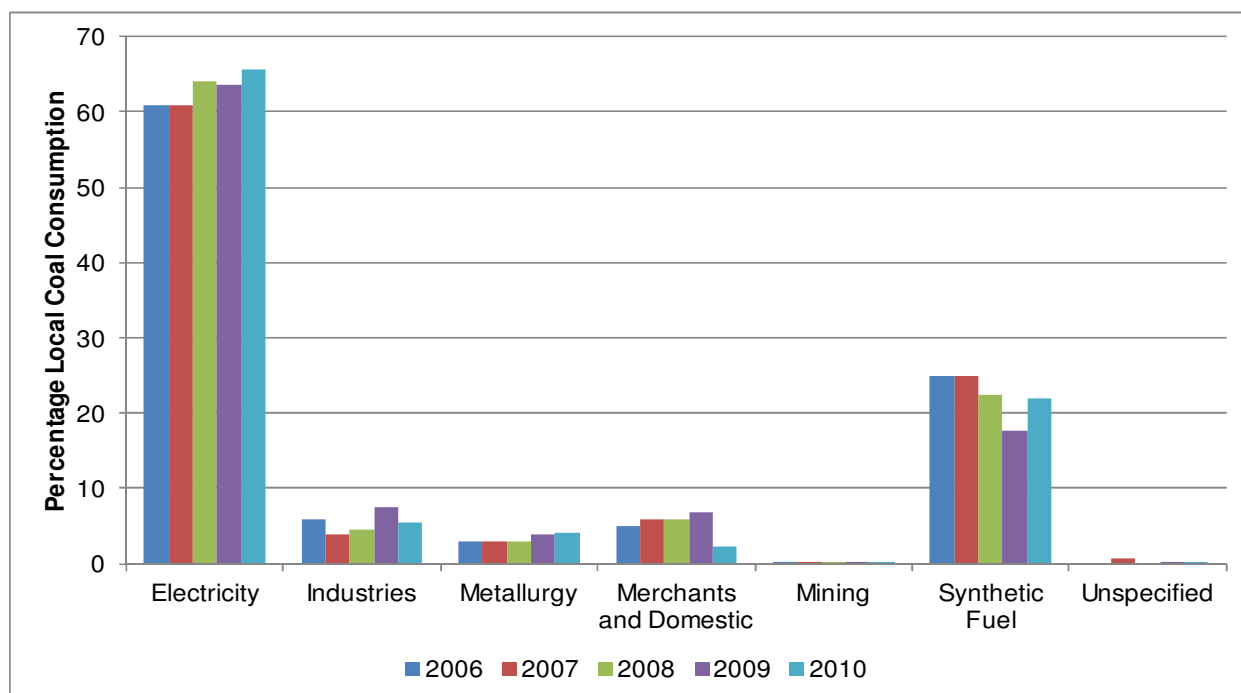
The country had also attracted huge interest from Indian mining entrepreneurs and traders looking to source coal from South Africa for India's burgeoning requirements.

## 2.2 Consumption

### 2.2.1 Local consumption

During the period under review, South Africa's local coal consumption averaged 74 percent of the total production, an average increase of 1.5 percent per annum from 177 Mt in 2006 to 188 Mt in 2010.

FIGURE 2: LOCAL COAL CONSUMPTION BY SECTOR, 2006 TO 2010



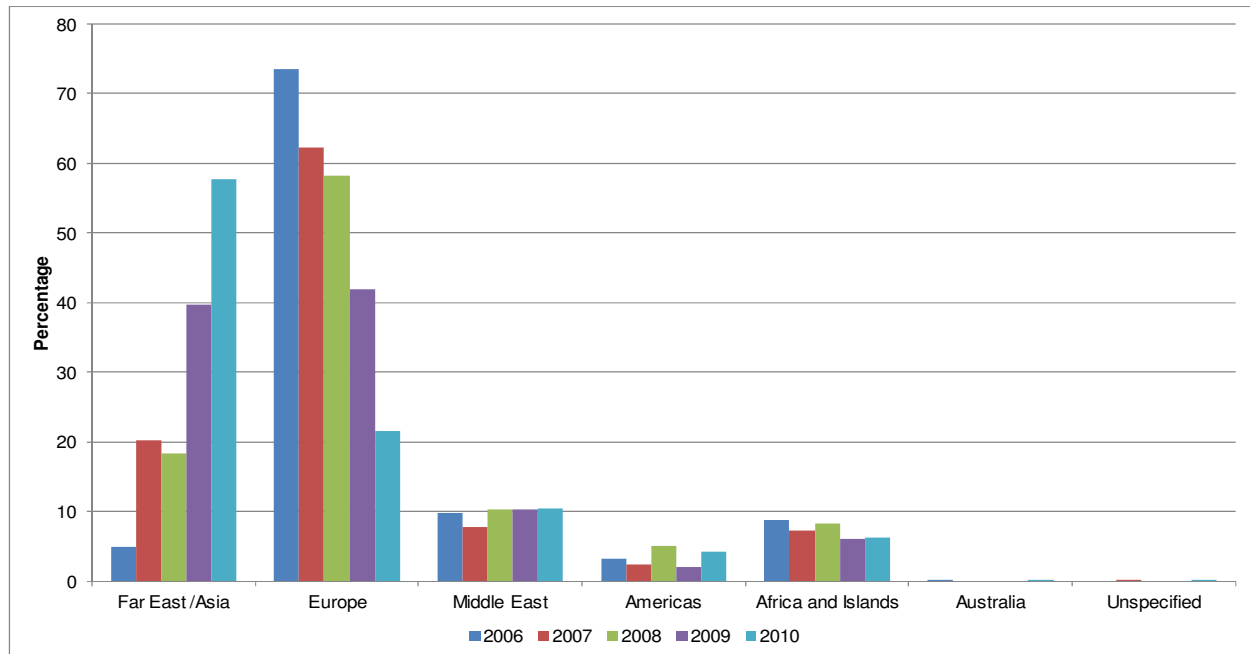
Source: DMR, Directorate Mineral Economics

The country's major coal consumer was the electricity generating sector which accounted for 65.6 percent of the local sales in 2010, up from 61 percent in 2006 (Figure 2). The synthetic fuels sector, the second largest consumer after the electricity sector grew by 2.6 percent per annum during the period under review. The sector accounted for 22 percent of the coal consumed locally in 2010. The metallurgical sector did not register any significant change during the review period.

### 2.2.2 Exports

South Africa's coal exports decreased by an average 0.85 percent per annum from 68.7 Mt in 2006 to 66.4 Mt in 2010. On average the country exported 26 percent of the total coal production during the period. The Asian block overtook Europe to be the top importer of South Africa's coal, with imports growing from 3.4 Mt in 2006 to 39.7 Mt in 2010 (Figure 3). India, China and Taiwan, respectively were the leading importers of South African coal. Europe's imports of South African coal dropped from 50.5 Mt in 2006 to 14.8 Mt in 2010 due to lower demand brought about by slower economic growth, which had impacted on the electricity demand of European countries.

FIGURE 3: SOUTH AFRICA'S COAL EXPORTS BY COUNTRY OF DESTINATION, 2006 TO 2010



Source: South African Revenue Services

The top three European importers of South Africa's coal were the Netherlands, Italy and Spain. Other importers of significant amounts of South Africa's coal include the Middle East, Africa, the Islands and the Americas. In the Middle East, Israel and United Arab Emirates were the top two importers of the country's coal. In Africa, Mozambique imported, on average, 1.5 Mt of South Africa's coal over the period.

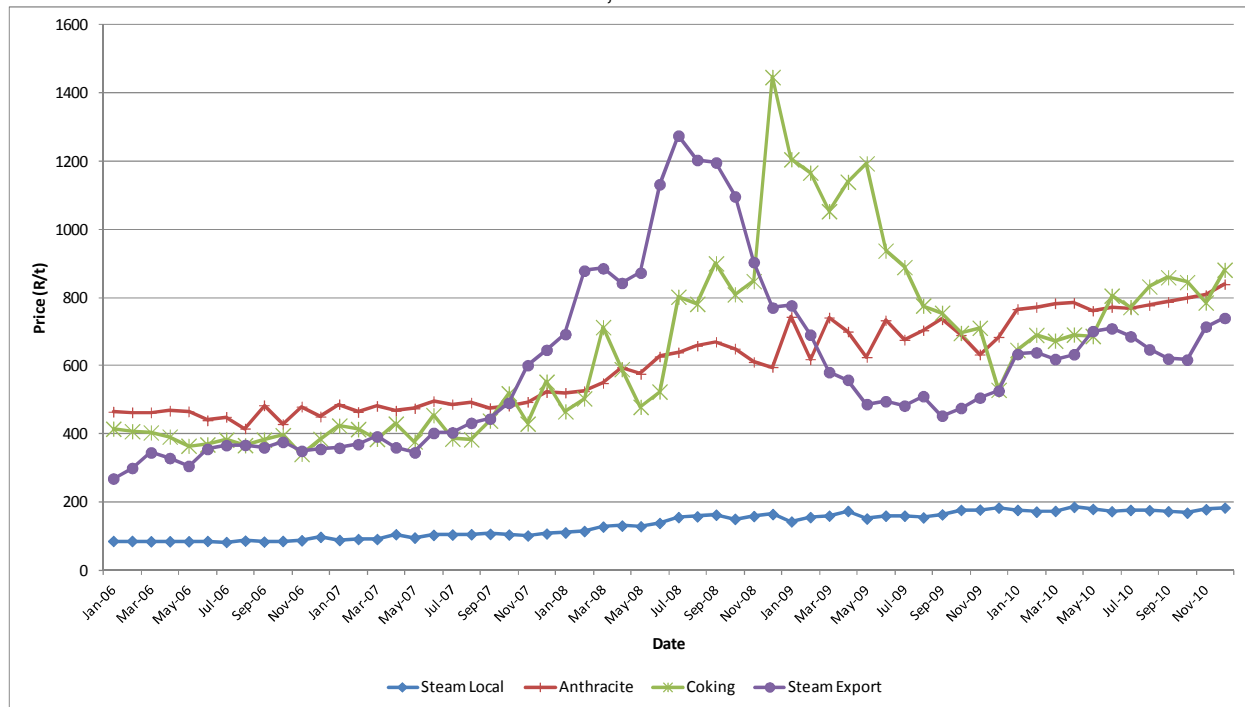
### 2.3 Prices

South Africa's steam coal export price averaged R300 /t in 2006. Strong demand from Europe propelled the price to reach R355 /t by December 2006 (Figure 4). Local steam coal prices also trended upwards, starting the year at R86 /t and reaching R98 /t by December 2006, mainly due to demand from the local electricity sector. Both local anthracite and coking coal prices did not change significantly during the year.

In 2007, South Africa's steam coal export prices averaged R437 /t, after starting the year at R359 /t, before increasing steadily to reach a high of R646 /t by December due to the stronger demand for South African coal from Asia, primarily India and Pakistan<sup>[2]</sup>. In the domestic market,

the lower availability of higher quality coal that was exacerbated by extremely high rainfall during the last quarter in 2007 resulted in robust increases in coal prices.

FIGURE 4: SOUTH AFRICA'S COAL PRICES, 2006 TO 2010



Source: (Steam export) [www.globalcoal.com](http://www.globalcoal.com)  
Local prices: DMR, Mineral Economics

Steam coal export price averaged R978 /t in 2008, an increase of 123 percent over 2007 average prices. Supply constraints early in 2008 also due to heavy rainfall and flooding, together with strong demand for South African coal, pushed the export coal prices to above R1270 /t in July. In August prices started to decrease, finishing the year at R770 /t.

Both steam coal export coal price and local coking coal price plunged in 2009 due to the global financial crisis. Export coal prices decreased from R776 /t in January 2009 to R526 /t in December 2009 whereas coking coal prices decreased from R743 /t to R683 /t during the same period. Anthracite and local steam coal prices continued to increase due to higher local demand from the electricity generation sector.

In 2010, export coal prices recovered significantly. The average price increased by 21.6 percent to R663 /t compared with 2009, on the back of Chinese, Indian and Korean demand. Towards the end of the second quarter of the year, Somali pirates activities added to the costs of Indian coal importers as ships took alternative routes to avoid the piracy infested traditional route along

the East Coast of Africa. Consequently, the voyage time was increased by about three days, resulting in less South African coal being traded to India during that period. Following this, the South African coal export price decreased to R685 /t in July 2010 and reached the lowest price of R617 /t by October. In the last two months of the year, prices recovered to reach R739 /t.

Local sales revenues increased by an average 17.2 percentage per annum from R19.7 billion in 2007 to R37.3 billion in 2011 whereas export sales revenue increased by 19.9 percent per annum from R24.4 billion in 2007 to R50.5 billion in 2011, both boosted by high coal prices.

## **2.4 Coal Projects**

The biggest challenge facing the SACI is meeting Eskom's demand for correct quality coal. Eskom estimates that, by 2020, it will require 160 Mt of thermal coal per year to meet its new capacity programme. This, according to Eskom will require about R175 billion in investments for the construction of about 15 new coal mines required to meet the demand. To this end, coal mining companies have invested significantly in expansion and new projects to meet Eskom's demand. Table 1 lists some major projects that are in advanced stages of development.

Exxaro Resources has also embarked on the expansion of its Grootegeluk Coal Mine near Lephalale, in the Limpopo province. The expanded Grootegeluk will supply about 14.6 Mt per year to the new Medupi power station by the end of 2014. The first coal from this expansion is expected in the second half of 2012.

Continental Coal Limited, an established South African thermal coal producer, has a portfolio of producing and advanced coal projects located in South Africa's major coal fields. Following the commencement of production at the Vlakvarkfontein coal mine in May 2010, and its acquisition of Mashala Resources in October 2010, Continental is targeting production from its portfolio of predominantly export thermal coal mines of 10Mtpa ROM by 2015. Other Continental Coal projects include Penumbra and De Witterkrans which, together with Vlakvarkvontein, will unlock about 64.28 Mt of saleable coal. The De Wittekrans project accounts for 43.81 Mt of these reserves with an estimated life of mine of 33 years. Continental Coal has invested a total of about R2.07 billion in these three projects. The company has other coal projects that are in the early stages.

TABLE 1: LIST OF SOME MAJOR COAL PROJECTS

<i>Name of project</i>	<i> Holding company</i>	<i> Full Production</i>	<i> Value</i>	<i> Projected annual output / Mt</i>	<i> Status of the project</i>
Grootegeeluk Medupi Expansion	Exxaro Resources	2015	R9.5 billion	15	65 percent complete
Thabametsi		2016	TBD <sup>#</sup>	6-17	Pre-feasibility
Belfast		2014	TBD	3-5	Pre-feasibility
New Largo	Anglo Inyosi Coal	2017	R12 billion	15	Feasibility stage
Vlakovarkfontein Mine	Continental Coal Ltd	Q2 2010	R55 million	0.12	Operating
Penumbra		Q4 2012	R284 million	0.750 (ROM)	Production to start Q4 2012
De Witterkrans		2013	R1.7 billion	0.315 (ROM)	Development to start Q2 2012
Klipspruit	BHP Billiton	Jul-09	\$450 million**	8 (ROM)	Completed in 2010
Douglas-Middelburg Optimisation		Q2 2010	\$760 million**	18.5	Completed July 2010
Makhado Coking Coal	Coal of Africa Ltd	Timeframe not confirmed <sup>##</sup>	R2.7 billion	5	Too early to state <sup>##</sup>
Mooiplaats Colliery		2014	R1.6 billion	3.2	Production started June 2009.
Vele Coking Coal Colliery		Not stated	R3.1 billion	5	Started producing in December 2011
Impumelelo Coal Mine	SASOL	Q1 2014	> R4 billion	8.5	On schedule
Thubelisha Coal Mine		2015	R3.1 billion	10.6	Completed May 2012 (Operational)
Shondoni Colliery		Not stated	R5 billion	9.5	Just been approved
Arthur Taylor Colliery Opencast Mine East	Xstrata	2013	R3.15 billion	5.7 (ROM)	Commissioned in Q3 of 2011
Mbila Anthracite Coal Project	Zyl and Mbila Resources	Q2 2014	A\$85 million <sup>z</sup>	0.84	Too early to state <sup>@</sup>
Vanggatfontein	Keaton Energy	May 2011	R403 Million	2.4	Production started April 2011

\*Mt = Million tons

\*\*US dollar

# To be determined

## Mining Weekly April 6-12, 2012

@ Mining Weekly April 13 -19, 2012

z Australian dollar

BHP Billiton completed two expansion projects for a total investment value of \$1 220 million during 2010. The Douglas-Middelburg optimization project will produce around 18.5 Mt per annum (Mtpa) whereas the Klipspruit project will produce about 8 Mt/a.

Another coal miner, Coal of Africa Limited (CoAL) has invested about R7.4 billion on three projects, Mooiplaats, Makhado Coking Coal and Vele Colliery. Mooiplaats produced its first saleable coal in June 2009 and it is expected to ramp up to 3.2 Mt/a by 2014. The Vele coking coal mine in Limpopo, where construction activities were halted last year amid environmental concerns, started producing in December 2011.

South Africa's coal-to-liquid fuels company, Sasol has invested about R12.1 billion on new mines that will replace three of their mines that are nearing the end of their useful life. The three new mines, namely, Thubelisha, Impumelelo and Shondoni projects (Table 1) will collectively unlock about 640 Mt of extractable coal in the Highveld coalfield.

### **3. COAL AND THE ENVIRONMENT**

South Africa depends mainly on fossil fuels for its energy needs, accounting for nearly 90 percent of the total primary energy needs with coal providing about 75 percent of the total energy needs. Ninety five percent of South Africa's electricity is generated from coal-burning power stations and more than 30 percent of liquid fuels are generated from coal via coal-to-liquid technology. Environmental concerns pose the main challenge to the utilization of coal as an energy source. Particulate emissions from the burning of coal and mining activities to extract coal impact negatively on the environment. Because of the country's carbon intensive electricity production process, Eskom has the highest green house gas (GHG) emissions in the country, followed by Sasol and Arcelor Mittal<sup>[3]</sup>, while South Africa is ranked among the top 20 countries with the highest GHG emissions. In order to reduce the country's carbon footprint, South Africa acceded to the Kyoto Protocol of the United Nations Framework Convention on Climate Change as a Non-Annex 1 country in 2002.

The Kyoto Protocol which was established in the Conference of Parties III (COP3) in December 1997 outlines legally binding obligations for developed countries to reduce their GHG emissions to targets below their 1990 levels between the years 2008 to 2012. The countries agreed to reduce emissions by an average of 5.2 percent from 1990 levels by the year 2012. Most countries have ratified the Kyoto Protocol, while the USA, the biggest emitter per capita, remains the only developed country which has not ratified the Kyoto Protocol. Canada and Russia have also pulled out of the Kyoto Protocol. All of them demanded the involvement of developing countries, as their emissions today account for more than half of the globe's GHG emissions<sup>[5]</sup>. These Kyoto Protocol shortcomings meant that the 2009 United Nations Climate

Change Conference, commonly known as the Copenhagen Summit, held at the Bella Center in Copenhagen, Denmark, between 7 December and 18 December, should establish firm commitments amongst parties to reduce emissions and agree on modalities required to achieve global emissions reduction to collectively mitigate the effects of climate change.

The Copenhagen Accord drafted by US, China, India, Brazil and South Africa on 18 December 2009, agreed that actions should be taken to limit the maximum global average increase in GHG emissions to no more than 2°C with reference to pre-industrial levels. Africa and South Africa called for a two-pronged legally binding outcome where Annex 1 (developed) countries that had joined the Kyoto protocol would agree on a 2nd commitment period under the protocol and for the developed countries who did not join the Kyoto Protocol to take comparable commitments under the protocol. The collective effort of developed countries was required to add up to required scientific levels of 40 percent aggregate GHG reduction from 1990 levels by 2020. In addition, developed nations should also contribute financially, technically (technology) and provide capacity building support. South Africa committed to reducing its GHG emissions by 34 percent by 2020 and 42 percent by 2025 on condition of availability of adequate financial, technological and other support. No agreement on the 2nd track of the outcomes was reached and further negotiations on this were deferred to the next Climate Change Conference that was to be held in Durban, South Africa in December 2011.

The 17th Conference of the Parties (COP17) to the United Nations Framework Convention on Climate Change (UNFCCC) and the 7th Session of the Conference of the Parties was hosted by South Africa from 28 November to 9 December 2011. The conference also served as the Meeting of the Parties (CMP7) to the Kyoto Protocol. The objective of this conference was to establish firm commitments amongst member countries to reduce carbon emissions and to agree to the modalities that will be required to reduce global GHG emissions to collectively mitigate the effects of climate change. The COP17 conference made resolutions, among others, to pledge money to start-up the Green Climate Fund, which would help developing nations in their efforts to access clean energy technologies in the future. The conference also resulted in the launch of a road map towards a global climate accord that will, for the first time, include all major emitters of greenhouse gases.



### **3.1 Mitigation against environmental impact**

South Africa, in its efforts to reduce GHG emissions and meet the target it set out for itself, has considered various policy instruments, including diversification of its energy mix, carbon taxation, emission trading schemes and Clean Coal Technologies (CCT). In the short term, two main economic policy instruments are being considered by government, these are, carbon taxation and emission trading schemes which put a price on carbon and curb green house gas emissions. In the medium to long term, CCT are being considered to reduce GHG emissions from industry and power generation. Also the Integrated Resource Plan (IRP 2010), which proposed that by 2030, South Africa's generation mix will include 48 percent coal as opposed to the current 70 percent will also go a long way in mitigating green house gases emissions.

#### **3.1.1 Carbon Taxation**

According to National Treasury, the South African government realized that environmentally related taxes have an important role to play in discouraging activities that impose high social costs and in helping to ensure that economic growth and development are sustainable. The carbon tax seeks to reduce emissions through the price mechanism directly, and South Africa is planning to introduce a carbon tax in 2013. To lessen the impact on industry, National Treasury proposed a 60 percent tax-free threshold on annual emissions for all sectors, including electricity, petroleum, iron, steel and aluminium in its 2012/2013 budget. Eskom would be able to claim additional relief of approximately 10 percent. National Treasury proposed a carbon tax of R120 per ton CO<sub>2</sub> equivalent for emissions above the thresholds. The levy would come into effect in 2013/14, and increase by 10 percent a year until 2020. A draft policy to be published later in 2012 has been sent for public comments. The coal industry was concerned that the current proposals on carbon taxes would have huge implications on the price of coal as well as the cost of electricity generated from coal-fired power stations.

#### **3.1.2 Emissions trading schemes**

Emissions trading or cap-and-trade is a market-based approach used to control pollution by providing economic incentives for achieving reductions in the emissions of pollutants. A central authority (usually a governmental body) sets a limit or cap on the amount of a pollutant that may be emitted. The limit or cap is allocated or sold to firms in the form of emissions permits which represent the right to emit or discharge a specific volume of the specified pollutant. Firms are required to hold a number of permits (or allowances or carbon credits) equivalent to their

emissions. The total number of permits cannot exceed the cap, limiting total emissions to that level. Firms that need to increase their volume of emissions must buy permits from those who require fewer permits. The transfer of permits is referred to as a trade. In effect, the buyer is paying a charge for polluting, while the seller is being rewarded for having reduced emissions. National Treasury is investigating the feasibility of an emissions trading scheme as a medium- to long-term response to climate change. Large emitters had been given until October 2013 to finalize carbon budgets, which would be used as a tool by policymakers for setting targets and determining action plans <sup>[6]</sup>.

## **4. CLEAN COAL TECHNOLOGIES**

Reducing greenhouse-gas emissions and the development of clean coal technologies have become important economic and political issues. In South Africa, there is research on the technologies that can mitigate greenhouse gas emissions in the medium to long term. Underground coal gasification (UCG), Carbon Capture and Storage (CCS) and Coalbed Methane are some of the technologies that have been researched in the country.

### **4.1. Carbon Capture and Storage**

CCS is a technology currently available to mitigate greenhouse gas emissions from large-scale fossil fuel usage, industry and power generation <sup>[7]</sup>. The Energy Technology Perspectives 2008 (ETP) BLUE Map scenario, which assessed strategies for reducing greenhouse gas emissions by 50 percent by 2050, concluded that CCS would contribute one-fifth of the necessary emissions reductions to achieve stabilization of greenhouse gas concentrations in the most cost-effective manner <sup>[7]</sup>. In 2009, the South African government, in collaboration with South African coal industry and international governments launched the South African Centre for Carbon Capture and Storage (SACCCS). SACCCS was mandated to further the understanding of CCS in South Africa and oversee the country's CCS roadmap. In 2004, the SACCCS completed the CCS potential assessments, and in 2010 the storage atlas was published which estimated South Africa's storage capacity at 150 Gt of CO<sub>2</sub>. Ninety-eight percent of this storage is offshore and two percent is onshore (Karoo basin and Zululand basin). The Karoo basin requires further investigation. Preliminary studies have shown that there are dolerite intrusions and permeability is poor in the Karoo basin. It is envisaged that in 2016, South Africa will have the first test injections, while by 2020 the country should have a demonstration plant and by 2025 the first commercial CCS plant will be available. It is crucial

that South Africa realizes these goals as the country has already committed to reducing greenhouse gas emissions by 35 percent by 2020 and 42 percent by 2025 subject to financial and technological support from the developed countries.

## **4.2 Underground Coal Gasification**

According to Eskom's conservative estimates, South Africa has an additional 45 Bt of previously unmineable coal suitable for Underground Coal Gasification (UCG). UCG is also one of several Clean Coal Technologies that can be used to mitigate greenhouse gases emission. Eskom is currently investigating UCG, where coal deeper than 300 m underground, considered unmineable in South Africa, is "mined" through the UCG. Eskom started the UCG project in 2001 at the Majuba power station. In this process, wells are drilled into the coal seam. At one end, a well is used to inject air into the system (to ignite the coal) whereas on the other end Synthesis gas (Syngas) from the gasification process is collected in pipelines. The main UCG drivers include security of supply, clean energy (lower CO<sub>2</sub> emissions), flexibility, utilization of unmineable coal and lower cost option (competitive R/MWh). So far the pilot plant has demonstrated that UCG would release 16 – 25 percent lower CO<sub>2</sub> emissions and achieve 50 percent more efficiency than a comparable coal fired power station. Eskom's UCG project has progressed and they are currently running a demonstration plant. The project programme is officially in the design phase of the demonstration plant and is currently within budget but five months overdue.

The Majuba colliery in the Ermelo coalfield is suitable for UCG since it is severely faulted with dolerite intrusions making conventional mining unfeasible, coal seams are 280 – 300 m deep and the coal seam thickness is 3.5 m on average making the coalfield unmineable (uneconomic) using conventional mining methods. Other coalfields, which Eskom suggested are suitable for UCG, are the Waterberg Basin, Springbok Flats Basin and the Free State Basin.

## **4.3 Coalbed Methane**

Coalbed methane (CBM) offers another alternative to using coal as an energy source. Methane provides cleaner energy than coal and CBM is seen as a commercially viable energy source. CBM is an environmentally friendly alternative that can assist South Africa to reduce greenhouse gases emissions in line with the targets set at COP15. According to the Petroleum Agency of South Africa (PASA), studies indicated a conservative estimate of around 10 trillion

cubic feet (tcf) resources for all CBM basins in the country. This puts South Africa in the fifth position globally after Canada (92 tcf), Russia (80 tcf), China (35 tcf) and US (11 tcf).

The most advanced prospecting project was completed by Anglo Coal in the eastern portion of the Waterberg area, in 2006. The project demonstrated that the area contained one tcf of recoverable methane gas. Exploration is proceeding and a second pilot test was under development with conceptual-level studies in progress.

In other projects, NT Energy Africa has been exploring for CBM in Free State, Mpumalanga and Limpopo. Kinetiko Energy in a joint venture with Badimo, will kick off CBM exploration in Amersfoort. Sunbird Energy, received funding for its two flagship CBM exploration projects in Ermelo and Limpopo province. Sunbird claims that the Mopane project in Limpopo offers a large resource with multitrillion-cubic-foot resource potential, which could support a large-scale power generation project.

## **5. TRANSFORMATION IN THE COAL INDUSTRY**

The government of South Africa has committed itself to achieving fundamental transformation of all institutions and their structures, systems and processes in post-apartheid South Africa. The government adopted policies and measures that aimed to bring about the goals of equity and redress historical inequalities, and to enhance democracy and participation of all groups in development and decision making processes at all levels. The mining industry was also expected to redress the historical inequalities that were built into the industrial dispensations under apartheid and commit to a new social order which reflects the social structure.

The coal industry had also embraced the government's call for transformation and the industry has seen several BEE coal miners entering the industry. The junior operators found it difficult to access funding for their exploration and mining activities, leading to some of these juniors selling their properties prematurely and hence defeating the objective of raising levels of participation of BEE companies in the sector. Secondly, BEE miners struggled to access the international markets because South Africa's coal biggest export facility, Richards Bay Coal Terminal (RBCT) is privately owned. The other two export facilities are too expensive for the BEE miners.

In 2002, government formed the Coal Industry Task Team (CITT) to assist junior BEE coal mining companies to obtain access the export market through RBCT. RBCT made a four million tons (Mt) export allocation available for BEE companies. The administration of CITT's 4 Mt (Quattro) allocation was handled by an appointed administrator.

Since the formation of the CITT, the number of BEE companies that need access to the RBCT to export coal has increased such that there is a need for additional export capacity. New entrants into the export market need to look at other export facilities like the Durban Port and Matola.

## **6. INFRASTRUCTURE**

Transport and water infrastructure are crucial to sustain the South African coal industry and unlocking the Waterberg coalfield. Currently, transport infrastructure for the central basin (Witbank, Ermelo and Highveld coalfields) and the coal line to Richards Bay are being strengthened. As coal reserves in the central basin diminish, a new rail corridor to the Waterberg coalfield will need to be developed within an overall strategic infrastructure investment plan, which will also address additional water supply for the Lephalale area.

In its National Development Plan (Vision 2030), the National Planning Commission (NPC) recognizes that the country's economy is well endowed with mineral resources and that the country can benefit greatly from Asia's growing demand for commodities. To do so, the country would have to improve water, transport and energy infrastructure. Consequently, the government is on an infrastructural development drive to meet the demands of a growing economy and population. The government announced that it would spend billions of rands over the coming years on new infrastructure and refurbishing the existing infrastructure. Developing and integrating rail, roads and water infrastructure would be centered around Waterberg and Steelpoort in the Limpopo province because of coal, platinum, palladium, and chrome deposits found in these areas. This infrastructural development programme would unlock the Waterberg coalfield.

The first rail project is Lothair, which comprises a combination of two upgrades to existing rail infrastructure in South Africa, and a new 46 km line that will join the Swaziland rail line. This will take the capacity on the RBCT coal line to 81 Mt per annum in a few years. Apart from the benefits of creating additional capacity on the RBCT coal rail line, the Lothair project also takes

the strain off operations at Ermelo which, in turn, creates capacity for additional coal freighted through from the proposed Waterberg corridor. Total investment required for this project is R17 billion and South Africa is expected to invest R12 billion of the capital cost with Swaziland carrying the balance (about R5 billion).

Another upgrade that would provide an alternative coal passage to the existing route that runs from Ermelo in Mpumalanga province to Maputo will be an upgrade of the Swaziland to Maputo route and is estimated to cost R1.8 billion. The Mpumalanga project will also entail connecting coalfields to power stations, enabling a shift from road to rail in the transportation of coal.

In Limpopo, the infrastructure project will focus on the development and integration of rail, road and water infrastructure. The Department of Water Affairs (DWA) commissioned the Mokolo Crocodile (West) Water Augmentation Project (MCWAP) to establish how the future water demands could be met. The infrastructure options considered to augment water supply to the Lephalale area included the following:

- De-bottlenecking of an existing pipeline, owned by Exxaro;
- Augmenting the supply from Mokolo Dam (Mokolo Augmentation); and
- A transfer scheme from the Crocodile River (West) to the Lephalale area (Crocodile Augmentation).

The de-bottlenecking of the existing pipeline that stretches from Mokolo Dam to Lephalale entails the construction of the first 9 km of the proposed gravity pipeline (for Phase 1) from the Wolvenfontein balancing dams, with interconnections to the existing pipeline. The intention of the de-bottlenecking is to improve the hydraulic gradient at Rietspruitnek, where the existing pipeline passes over a high point <sup>[8]</sup>.

The system will run parallel to and tie into the existing infrastructure that supplies the Exxaro Grootegeeluk Mine, the Eskom Matimba Power Station and the Lephalale Local Municipality with bulk water. Exxaro owns and operates the existing water system, which will be acquired and incorporated into the new government waterworks. The target completion time of phase 1 is the end of 2013.

Phase 2 entails the planned construction of a water pipeline from the Klipvoor dam over the Vlieepoort weir at Thabazimbi to the Waterberg. This pipeline will be able to supply 220 million

cubic metres a year at a cost of R25 billion. Both the government and users will together finance the construction of the pipeline because potential users of the water would have buy options in order to get supply from this pipeline. These developments would unlock the enormous mineral belt of coal and other minerals in Limpopo.

In recent years, coal trucking for Eskom has grown to become the largest heavy haul operation in the country and this had a negative impact on the state of roads. Subsequently, a logistics strategy, focusing on migrating primary energy transportation from road to rail, was developed. This strategy had since been identified as a project for the Presidential Projects Strategic Integrated Programme (PPSIP). Approximately R9.79 billion will be spent on implementing the Road to Rail Migration Strategy in Mpumalanga which will result in a reliable coal haulage network with a rail capacity of approximately 32 Mtpa by 2018. Eskom is working closely with Transnet Freight Rail to execute this strategy which will ensure that all coal logistics are done in a safe and socially responsible manner and minimise the adverse environmental impact of coal transport. The Road to Rail Migration Strategy will result in 140 km of new rail in Mpumalanga and 600 km of rail from the Waterberg to Mpumalanga while removing about 2500 daily road truck trips for coal delivery.

## **7. RESERVES AND RESOURCES STATEMENT**

To ensure domestic security of coal supply for existing and newly built power stations, the government through Eskom and the Council for Geosciences (CGS) initiated the Reserves and Resources study that will enable more comprehensive coalfield planning for coal exploitation. This study is the first comprehensive assessment of the country's coal resources and reserves since the Bredell report published in 1987. Since then there have been significant changes in the coal industry which necessitated an updated assessment as an input to long term national infrastructure and coal industry planning processes. Since 1982 when De Jager determined that South Africa had 114 870 Mt "in situ mineable resources", of which 59 241 Mt were estimated recoverable reserves, the country had no authoritative resource study <sup>[9]</sup>. In 2009, Prevost adjusted the reserves to 33 118 Mt <sup>[19]</sup>. The South African Council for Geosciences is currently compiling an updated inventory of resources in the country which should assist in quantifying resources available to export and domestic markets. The report is expected in the second half of 2012. This report would assist the government to provide greater policy and regulatory certainty to investors.

## **8. SOUTH AFRICAN COAL ROAD MAP**

In 2009, the South African coal industry formulated the South African Coal Road Map (SACRM) to map out various scenarios for the country's future energy sources in an effort to find the best way to move forward. The SACRM aims to do the following:

- To serve as a fact-based overview of the current South African Coal Industry – various alternative scenarios over a 30-year horizon.
- A review of national and international issues affecting South African Coal across all elements of the value chain.
- To identify appropriate enablers, including developmental requirements, to deliver the identified scenarios – and possible consequences.
- To facilitate planning, investment and strategy development for a wide range of stakeholders.
- A platform for the sharing and dissemination of knowledge – to align all stakeholders and their objectives, and collectively support societal and economic objectives like accelerated growth, employment, environmental responsibility, capital and social investment.

The SACRM has two phases. Phase I comprised a summary or fact base of the current state of the South African coal industry and key issues facing it, and a description of three scenarios, namely; significant coal use, moderate coal use and low coal use. Phase I is complete and a fact-based report will be released in the second half of 2012.

Phase II of the project would describe and analyze the scenarios identified in Phase I. After a couple of workshops, an alternative scenario framing was put forward, the main consequence of which was that the three scenarios identified during Phase I of the SACRM study were repackaged as four scenarios, namely; “high global and local response to climate change”, “low global and local response to climate change”, “high global and low local response to climate change” and “low global and high local response to climate change”. Currently the scenarios are being analyzed. From these scenarios a roadmap will be derived and a final roadmap document will be developed and delivered in the fourth quarter of 2012.

## **9. CONCLUSION**

South Africa's coal production is almost stagnant, because at the same time as new mines are starting to operate, some mines close down due to depleted resources, especially in the Mpumalanga and KZN coalfields. The Waterberg coalfield is expected to sustain the country's



coal industry going into the future. South Africa's coal production is expected to grow significantly in the next decade, driven by domestic power requirements and export demand from Asia.

South Africa has realized the need to reduce green house gases while growing the country's economy which is carbon based. The country developed strategies that would address the emission of green house gases as committed at Copenhagen. The implementation of a regulatory framework that would assist in the implementation of CCS is important.

Coalbed methane and underground coal gasification also present the opportunity to mine uneconomical coal seams whilst minimizing the country's carbon footprint. The conversion of CBM into energy can help cut South Africa's reliance on coal for energy while at the same time creating a new industry that would create jobs.

The government infrastructural upgrade will establish a coordinated, sustainable and environmentally friendly approach to infrastructure planning and delivery across government and industry. The coal industry will benefit from new investments as investors will have confidence in the country's infrastructure.

On average, South Africa's local steam coal prices increased steadily during the period under review. Anthracite prices, coking coal prices and export coal prices were four times higher than the local steam coal prices. These upwardly trending coal prices will generate revenue that would sustain the coal industry and provide job opportunities to the country's economy.

On the transformation front, the industry is managing to unearth small or junior coal miners but an obstacle faced by junior miners is that export facilities are not accessible to them. The CITT's four Mt/a allocation through the RBCT is not enough for junior coal miners. Transnet's railway expansion project might open up the export facilities for the junior miners. However the port facility owners need to heed government's message of transformation and make available reasonable export allocations for junior coal miners.

The Council for Geosciences' Resources and Reserves statement and the South African Coal Roadmap will assist the country formulate a coal policy. Such a policy is urgently needed as it will ensure the country's security of energy supply.

Based on India's power plant expansions, the country had become South Africa's single largest coal export destination. Demand growth in Indian coal imports is expected to remain steady as a major shortfall in power generation already exists.

Going forward, South Africa's coal industry will be driven by infrastructure development, development of the Limpopo resources, supply of domestic coal to Mpumalanga power stations and continued exports. Domestic demand for coal is likely to rise further as Eskom brings into operation a number of old power stations and two new coal burning stations. The major coal projects discussed in this report are likely to sustain the country's coal production in the short and medium terms. In the long term the Waterberg coalfield is expected to be the country's major coal supplier.

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