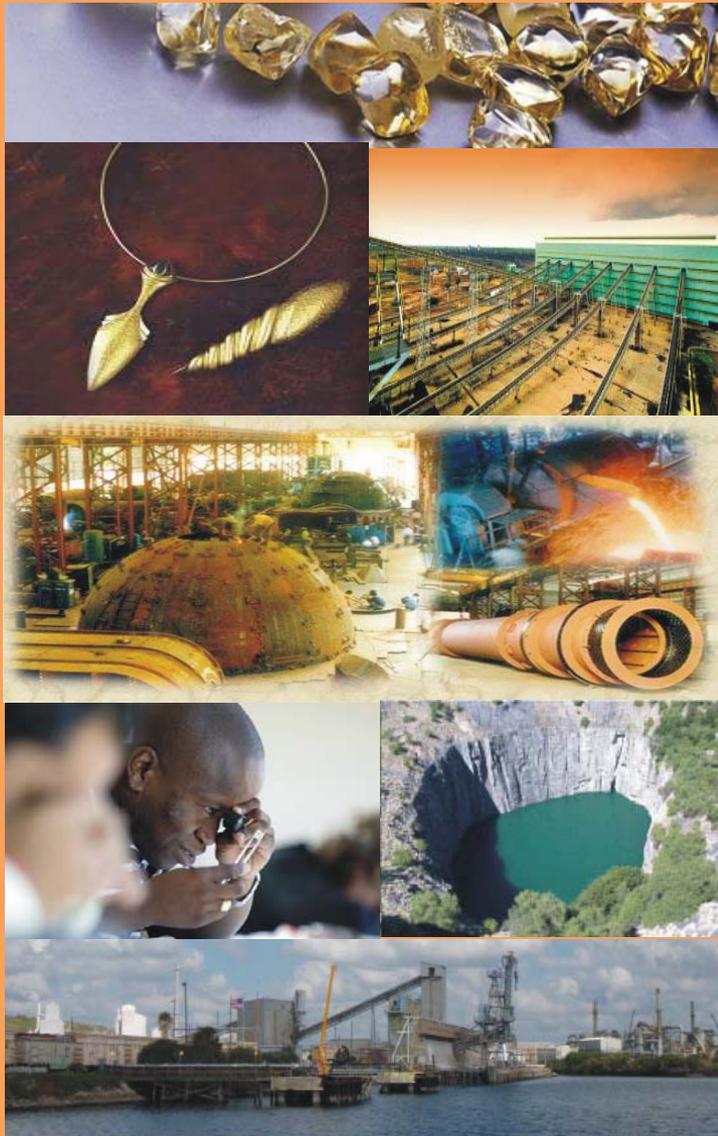


THE BENEFICIATION STRATEGY



the dme

Department:
Minerals and Energy
REPUBLIC OF SOUTH AFRICA

Draft for Public Comment

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GLOSSARY

AMI	-	Advanced Metals Initiative
APDP	-	Automotive Production and Development Programme
ASGISA	-	Accelerated and Shared Growth Initiation of South Africa
BBBEE	-	Broad-Based Black Economic Empowerment
CBM	-	Coal Bed Methane
CIP	-	Critical Infrastructure Programme
CTL	-	Coal to Liquid
DME	-	Department of Minerals and Energy
DSM	-	Demand Side Management
DST	-	Department of Science and Technology
DTI	-	Department of Trade and Industry
GDP	-	Gross Domestic Product
IDZ	-	Industrial Development Zones
IPP	-	Import Parity Pricing
JIPSA	-	Joint Initiative on Priority Skills Acquisition
KAP	-	Key Action Plan
MPRDA	-	Minerals and Petroleum Resources Development Act
MQA	-	Mining Qualifications Authority
NIPF	-	National Industrial Policy Framework
PBC	-	Platinum Beneficiation Committee
PGM	-	Platinum Group Metals
PVC	-	Polyvinyl Chloride
R&D	-	Research and Development
SDT	-	State Diamond Trader
SETA	-	Sector Education and Training Authority
SIP	-	Strategy Investment Programme
SMME	-	Small, Medium and Micro Enterprise

PURPOSE

The value proposition of the beneficiation strategy presents provision for a framework within which South Africa can implement an orderly development of the country's mineral value chains in order to leverage benefit from inherent comparative and competitive advantages. Essentially, the strategy is intended to support national programmes such as the National Industrial Policy Framework (NIPF), consistent with the provisions for a sector specific strategy and key action plans for downstream mineral beneficiation as well as the development of the nuclear power capacity, for instance, which is intended to diversify the country's energy basket and to ensure security of energy supply. The strategy will also advance the objectives of the Accelerated and Shared Growth Initiative of South Africa (ASGI-SA), the Minerals and Petroleum Resources Development Act, the Broad-Based Socio Economic Empowerment Charter, the Precious Metals Act, the Diamond Amendment Act, energy growth plan as well as compliance with the Kyoto protocol.

VISION

The strategy seeks to facilitate economic diversification, expedite progress towards a knowledge based economy and attain incremental GDP growth in mineral value addition per capita in line with the vision outlined in the NIPF and the Advanced Manufacturing Technology Strategy.

SCOPE

The scope of the document covers the beneficiation of ten mineral commodities and selects five value chains that would flow from these commodities. Although the value of side-stream beneficiation is recognised, the strategy focuses on the opportunities for downstream beneficiation with respect to the ten identified commodities, and proposes measures that would be investigated to address particular challenges. The beneficiation strategy applies to all mineral commodities of South Africa – the value chains specified herein are indicative of the potential that would be achieved.

The successful implementation of this strategy depends on intensive co-ordination across a range of government departments, particularly the Departments of Minerals and Energy, Trade and Industry, Science and Technology, Public Enterprises and Finance as well other stakeholders, including business and labour.

1. INTRODUCTION

The ¹beneficiation strategy is aimed at providing a strategic focus for South Africa's minerals industry in terms of developing mineral value chains and facilitating the expansion of beneficiation initiatives in the country, up to the last stages of the value chain. In terms of Section 26 of the Mineral and Petroleum Resources Act of 2002, as proclaimed in 2004, the Minister of Minerals (1) may initiate or prescribe incentives to promote the beneficiation of minerals in the Republic and (2) If the Minister, acting on advice of the advisory Board and after consultation with the Minister of Trade and Industry, finds that a particular mineral can be beneficiated economically in the Republic, the Minister may promote such beneficiation subject to such terms and conditions as the Minister may determine.

The strategy is aligned to broader national objectives, including, albeit not limited to the NIPF, AsgiSA, nuclear build program, MPRDA (Section 2), BBBEE Charter, Precious Metals Act and the Diamond Amendment Act. The strategy is premised on the need to unlock downstream and side-stream values and it provides the initial analysis of opportunities and challenges in downstream beneficiation as well as suggesting instruments that must be investigated and implemented to enhance value addition.

Downstream value addition involves a range of activities including large-scale capital-intensive activities such as smelting and refining as well as labour-intensive activities such as craft jewellery and metal fabrication. Side-stream value addition refers to inputs, namely capital goods, consumables and services, into the value chain. The total net beneficiation of minerals is maximised by a combination of downstream and side-stream linkages.

The beneficiation strategy for the minerals industry of South Africa draws from a range of legislation and policies which include the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) and the Broad-Based Socio-Economic Empowerment Charter for the Mining Industry (Mining Charter). One of the objectives of the MPRDA is to "*promote employment and advance the social and economic welfare of all South Africans*". The Act mandates the Minister of Minerals and Energy to initiate or prescribe incentives to promote beneficiation and to

¹ The term mineral "beneficiation" entails the transformation of a mineral (or a combination of minerals) to a higher value product, which can either be consumed locally or exported. The term "beneficiation" is used interchangeably with "value-addition" or "downstream beneficiation". The beneficiation of minerals includes downstream and side-stream linkages (input sector, such as R&D for new product development).

advance beneficiation activities of particular mineral commodities, where it is economical, and at the advice of the Mining and Minerals Board.

The strategy is premised on an initial study of ten mineral commodities, the five value chains of which are presented to demonstrate intrinsic, multi-tier value proposition benefits for South Africa, including creation of new jobs, development of requisite skills, investment in research and development, economic growth, sustainable development and cost-effective support for the broader policies of government. A number of key constraints to effective implementation of the beneficiation strategy are identified and key action plans intended to mitigate such constraints are also presented. Ultimately, a qualitative assessment of the impact of the strategy is also presented.

2. GLOBAL PERSPECTIVE

Developing countries are increasingly playing a bigger role in global economic growth, driven mainly by Brazil, Russia, India and China (BRIC). The International Monetary Fund predicts developing countries' growth, averaging 7%, to lift world economic growth. Robust growth in developing countries confirms assertions that the world has entered a new growth phase that will precipitate a long term high demand for natural resources, goods and services. Individually, the Chinese and Indian economies lead the pack with 2005 economic growth rates of 10.7% and 9.0 % respectively.

The per capita consumption of base metals and steel generally tends to rise with income. Countries in their early stages of development use long steel for infrastructure and construction purposes whilst more developed economies use flat steel for manufacturing. Following a period of high steel intensive growth, between US\$15000 and US\$20000 Growth Domestic Product (GDP) per capita, the USA, South Korea, Japan and Taiwan reached a saturation point in their consumption of steel followed by a tapering thereof. China's GDP per capita is currently just over US\$6000 which is some distance below the US\$16000 inflection point experienced by most developed economies. If the development path of China follows that of its predecessors, the conclusion can be reached that its consumption of commodities is likely to continue well into the foreseeable future. This may very well imply that the current commodities boom may continue for some time.

The Chinese GDP has grown at a staggering average of 9.5 % in the last two decades, which has coincided with levels of capital formation to the tune of 40% of GDP. Along with this has been intense industrialization and urbanization. All of this has ensured that China is consuming

commodities at a rate that has been largely responsible for the recent commodities boom (e.g. 30% of world's steel, which is more than what is consumed by the USA and EU combined).

South Africa's resource endowment puts it in a favourable position to greatly benefit from the Asian economic boom. Already the effects are evident in the form of increased exports, investments and exploration activity. Further opportunities from the Asian demand lie in the ability of the South African mining and metals industry to supply products with a significant local value add. Fundamentally the interest in South Africa's commodities must translate into strengthening linkages with other sectors of the economy.

3. BENEFICIATION VALUE PROPOSITION FOR SOUTH AFRICA

The beneficiation strategy framework seeks to create an environment for effective value addition of South Africa's minerals, contributory to a range of broader national programs such as the NIPF, AsgiSA, BBSEE, diversification of the energy basket, security of energy supply as well as advancement of research and development. The strategy is essentially located within the provisions of a number of policy frameworks, including the NIPF, Section 2 of the MPRDA, the BBSEE Charter, Precious Metals Act, Diamond Amendment Act,

Introduction of more stringent environmental laws in some parts of the world present additional opportunities for South Africa to attract investment, technology and skills to expedite growth in the sector. This proposition recognises the importance of the balancing act between much needed socio-economic growth and compliance to established environmental laws of the country.

The concept of beneficiation is not new in South Africa. For an example, the bulk of the country's electricity is generated from coal power stations, which consume more than 50 per cent of the country's annual production of coal. Consequently, the country's economic growth was sustained over an extended period, as a result of the globally cost-competitive form of electricity fuelling the economic growth and creating jobs. Currently, new forms of beneficiation opportunities are sought to compliment the conventional electricity generation in the country, which will underpin the much needed economic growth. The development of Coal-To-Liquid technology in South Africa further augments the need for investment in research and technology for prospects of discovering innovative means of optimising utilisation of mineral resources for the benefit of South Africa.

In 2007, gross revenue from sales of all minerals in South Africa amounted to just below R225 billion. Similarly, just over R40 billion was generated from processing of base metals as well as precious metals and minerals, which represented less than 10% of the total volumes of minerals

produced. This demonstrates the increase in value of minerals, once beneficiated, contributing to economic growth, creating jobs and concretising the requisite skill base. While comparative studies on beneficiation, such as characterisation of the experience of the NORDIC countries, are useful, it must be appreciated that their experience developed under a completely different economic and political configuration, albeit a common characteristic is the sole government investment in driving the beneficiation equivalence initiative. Contrary to the findings of the study of the Harvard intellectuals, the 2008 Nobel recipient on economics, Prof. Paul Krugman of Princeton University (USA) supports value addition of commodities from producer countries and proposes that comparative advantage can be readily translated into competitive advantage if managed in a coordinated manner, which will in turn derive optimal benefit for the source countries.

3.1 COMPARATIVE ADVANTAGE

South Africa's endowment of mineral resources merely presents the country with a comparative advantage for developing downstream beneficiation. However, based on South Africa's historical mineral industry strength, there is a potential to attract and develop technological excellence in mineral related industries to support downstream value addition.

3.2 COMPETITIVE ADVANTAGE

Over the past ten years, the South African mining sector has undergone a noteworthy transformation from largely exporting raw minerals to establishment of value-addition facilities (mineral processing and manufacturing). This has resulted in increased revenues from the ferrous and non-ferrous mineral sectors, with total annual sales of ferro-alloys (representing a percentage of input ores produced in South Africa) exceeding R20 billion in 2005, from a base of R11,6 billion from all ores of ferrous mineral sales generated in the same year. This transition has partly resulted in the construction of a number of large scale resource-based investment projects, such as Columbus Stainless Steel, Saldanha Steel, Lion ferro-chrome smelter and others. This demonstrates the country's state of readiness for value addition, albeit currently in a less orderly manner, the strategy seeks to streamline the value addition programs in South Africa and expedite further development of the sector.

The increasing regional and continent-wide geo-political stability present prospects for additional (and proximal) market access for South Africa's beneficiated products in support of planned infrastructure programs, consistent with the country's economic policy. Similarly, the country has initiated good trade relations with a number of established and developing countries.

South Africa continues to upgrade and create essential infrastructure, including an extensive transport network (road, rail, ports and pipelines), information and communications infrastructure and has a highly advanced financial and banking system. Well established and reputable technology and training institutions can be readily resourced to advance skills and technology development that is required for industrialisation. As a result of this focussed investment, the country is best positioned to take full advantage of value addition programs.

4. CROSS-CUTTING CONSTRAINTS TO BENEFICIATION – SOUTH AFRICA

This chapter identifies current inhibitive factors to effective implementation and development of the beneficiation programs in the country, namely:

- a) Limited access to raw material for local beneficiation - This constraint is resultant from the current structural arrangement of the mining industry, which remains geared towards export orientation of raw material, with the bulk of current producers bolted in long term contracts with their international clients.
- b) Security of energy supply – The recent unprecedented levels of energy demand, compounded by lack of investment in energy generation as well as South Africa’s historical culture (business, public sector and individuals) of inefficient energy utilisation, resulted in deficit of energy supply in the first quarter of 2008. The bulk of beneficiation programs require large and uninterrupted supply of energy.
- c) South Africa’s limited exposure to break-through research and development programs thwarts the prospects of innovation in creating new products for beneficiation
- d) Skills sought for expediting local beneficiation - While the challenge for skills is not limited to South Africa, the skills-supply pipeline for scientists and engineers requires specific attention.
- e) Access to international markets for beneficiated products – the current trade barriers in some prospective recipients of South Africa’s beneficiated products limits access to these markets
- f) Distal locality of mining operations to established manufacturing hubs and lack of infrastructure capacity linking the two.

The mitigating interventions for these constraints are presented under section 5.1

5. STRATEGIC FRAMEWORK

Effective implementation of the beneficiation strategy is sited on a 4-pillar framework, namely, (1) The enabling regulatory framework – the beneficiation strategy is rooted in the various policy provisions and seeks to support the broader government programs, such as the industrialisation

policy (NIPF), the MPRDA, energy diversification and efficiency (Figure 1). Effective coordination of all of these frameworks is critical for the successful launching of the strategy.

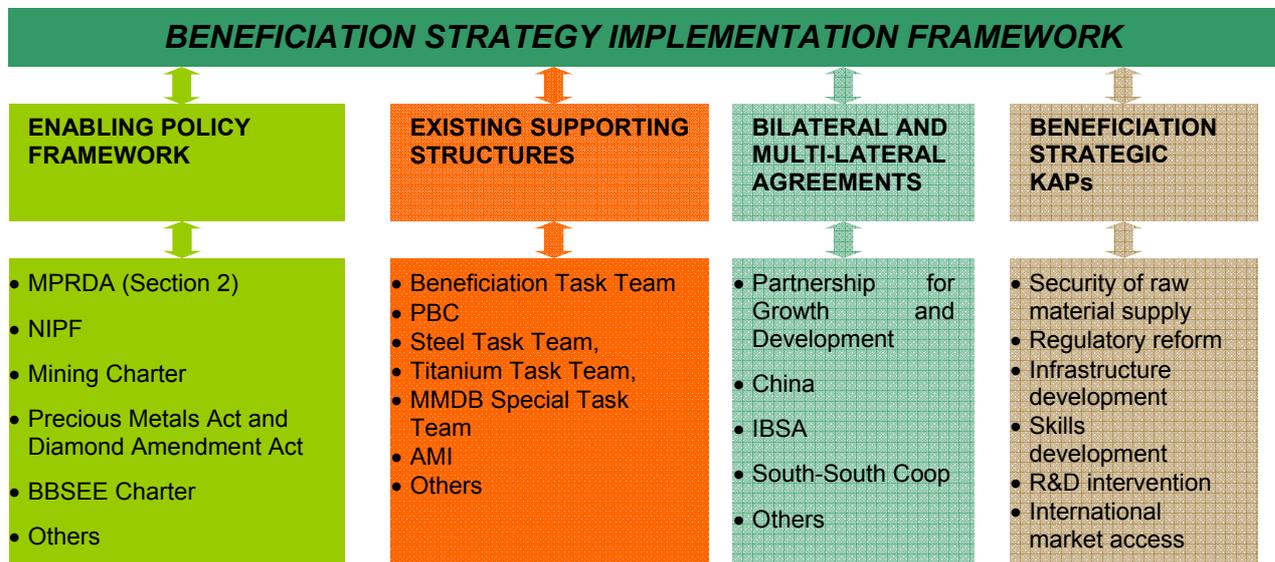
A regulatory incentive intended to stimulate beneficiation proposes an off-set against the BEE percentage of the Mining Charter, calculated per commodity stream, which is based on an agreed formula (per commodity stream). The formula considers allocation of production towards local beneficiation after promulgation of the MPRDA.

- (2) Existing multi-stakeholder structures supporting various aspects of beneficiation – These structures have been created to identify and execute specific value chains (or aspects thereof). The existing structures outlined in Figure 3 complement the objectives of the strategy and play an important role in informing the KAP’s of this Strategy.

Coordination of these established structures must be maximised in order to achieve the collective objective of beneficiation in South Africa, i.e. attain a coordinated and incremental growth in beneficiation.

- (3) Existing international agreements (bi- and multi-laterals) - The bulk of the current agreements (bilateral and multi-lateral) present opportunities for South Africa to leverage optimal benefit aimed at implementing the strategy. These agreements must be aimed at assisting in addressing some of the impending constraints, such as economic diplomacy sought to access international markets for South Africa’ benefited goods.
- (4) Beneficiation strategic KAPs - The document highlighted the cross-cutting constraints affecting effective beneficiation, for all minerals – the KAP’s are primarily intended to identify and recommend remedial action to lessen the impact of such identifies constraints to the development of the beneficiation sector.

FIGURE 1: IMPLEMENTATION OF THE BENEFICIATION STRATEGY



5.1 KEY ACTION PLANS

Each of the identified cross-cutting constraints requires mitigating intervention(s) from all stakeholders. These interventions are intended to moderate or remove such limitation, in order to implement the beneficiation strategy effectively. Table 1 summarises cross cutting strategic actions, responding to each of the constraints and proposes intervention by the two main stakeholders, viz. government and business.

TABLE 1: CROSS CUTTING ACTIVITIES AND KEY ACTION PLANS

STRATEGIC ACTIONS	KEY ACTION PLANS	
	Government	Business
Infrastructure Development	Investment in rail, ports, pipelines and capacity and maintenance	Align production plans with national programs
	Facilitate security of energy supply	Embrace energy efficiency Explore co-generation prospects
Investment promotion and facilitation	Partner private sector in beneficiation projects (through State entities)	Re-evaluate IRR's on new projects to identify investment hurdles preventing SA development
	facilitation of international trade agreements (new) to enhance mineral beneficiation in SA (investment in RSA and access to international markets)	Commitment to establishment and support of beneficiation projects in SA Develop export markets for beneficiated products
	Investment promotion	Commitment to ensuring the supply of raw materials
Skills development	Promote skills development and partner with the relevant SETA's for training and labour development	Investment in Human Capital Development
	Leverage on JIPSA for required skills	Co-operate with government to leverage on JIPSA for required skills
Enabling regulatory environment	MPRDA amendments to strengthen beneficiation	
	Evaluate prospects of establishing favourable trading conditions (such as export duties) on ores/concentrates where appropriate, in line with the trade policy currently being developed by the Dti.	
	Anti-Import Parity Pricing strategies that actively encourage competition, strengthen Competition Policy, and eliminate anti-competitive pricing of intermediate feedstock	
R&D and technology	Partner private sector in beneficiation R&D (Mintek, CSIR)	Support and develop globally competitive technologies
	Supporting policy for clean and efficient use of coal in power generation	

6. SELECTED VALUE CHAINS

This section indicates the advancement of selected mineral commodities through various stages of beneficiation, creating specific value chain(s), five of which have been selected based on their potential for development to the last stages of downstream beneficiation (table2).

The substantial increase in third-stage beneficiation achieved in the chemicals and metals industries is a direct result of policy orientation in the 1990's that partly targeted these value chains, supported by other institutions and incentives. However, these measures did not directly create sustainable employment and did not stimulate downstream fabrication, in part because of the prevalence of anti-competitive import-parity pricing and in part because of the lack of long-standing economic relationships and infrastructure to support it. The challenge for these value chains therefore, is largely to identify where greater fourth-stage beneficiation (fabrication) can be initiated.

TABLE 2: SELECTED COMMODITIES AND VALUE CHAINS

SELECTED COMMODITIES										
SELECTED VALUE CHAINS	Gold	PGM	Diamonds	Iron Ore	Chromium	Manganese	Vanadium	Nickel	Titanium	Coal and Uranium
Energy										√
Steel/Stainless steel				√	√	√	√	√		
Pigment production									√	
Auto-catalyst and diesel particulate		√								
Diamond processing and Jewellery	√	√	√							

6.1 ENERGY COMMODITIES

Projections of energy demand growth in South Africa, the region and the world indicate aggregated annual growth rate of 3.2% to 2030². This demand growth challenge is compounded by climate change implication, as fossil fuels consumed in the generation of power are targeted as well as the important role of coal in power generation. Demand for low grade coal is also principally driven by the resurgence of the Asian economic players, viz. China and India as well as other developing economies. This energy demand growth is likely to introduce additional price pressure on the prices and accessibility of coal in South Africa. ³The forecast growth in demand will not alleviate the major concerns around energy poverty. In 2000, only one in six people worldwide had the access to energy required to provide the high living standards enjoyed in the developed world. These one billion people consumed over 50% of the world's energy supply, while the one billion poorest used only 4% [WBCSD 2004]. As UN-Energy stated: "This situation entrenches poverty, constrains delivery of social services, limits opportunities for women and erodes environmental sustainability at the local, national and global levels".

6.1.1 COAL

Energy is essential to poverty alleviation. All fuel sources will be needed, but as the most abundant and affordable of all the fossil fuels, the role of coal will be vital. Coal will continue to play a significant role in meeting energy demand worldwide. The world currently relies on coal for 40% of its electricity and 66% of steel production is dependent on coal. Many countries rely on coal for much greater proportions of their electricity – South Africa, China, and India, for example, use their large, indigenous supplies of coal to generate most of their electricity. In the future, coal conversion technologies will make synthetic gas and liquid transportation fuels derived from coal an attractive alternative. Coal also plays an important role in cement manufacturing and other industrial processes.

The bulk of the South African energy is generated from coal power stations, which emit significant proportions of Carbon dioxide and other gasses. These emissions are high on the agenda of the Kyoto protocol, to which South Africa is a signatory. In order to be compliant, the current status quo recommends that the gasses be captured at source and sequestered in rocks (geological formations) at depths, in an attempt to mitigate their contribution to global warming. The imminent introduction of a price on carbon (either a carbon tax or market mechanism) will have implications and may contribute to an increase in the cost of electricity. Opportunities exist for research and development to be directed at finding an alternative approach, such as potential of recycling the

² BP 2005, BP Statistical Review of World Energy, June 2005, BP, London

³ This paragraph is an extract from the report of the "World Coal Institute" of 2007.

use of captured gases in the process of energy generation for re-generation of electricity as well as other uses (beneficiation), for the benefit of South Africans, in order to comply to the Kyoto, derive a low/no carbon emission growth, while also contributing to increasing our energy basket.

The key action plans for optimal value creation (beneficiation) of coal:

- a) Policy support for clean and efficient use of coal in power generation can encourage the take-up of existing advanced technologies for low emissions coal-fired electricity production – providing secure and clean energy.
- b) Policy support for technology transfer, through mechanisms such as the Clean Development Mechanism, bilateral and multilateral funds such as the Global Environment Facility and the Prototype Carbon Fund.
- c) Investment into research, development and demonstration of new technologies such as clean coal technologies and carbon capture and storage. These could provide a very significant opportunity for the major reductions in emissions.
- d) Investment in R&D to find innovative means for beneficiation (recycling) of gasses emitted in the generation electricity.
- e) Investment in technology to optimise use of coal bed methane (CBM).
- f) Investment in research for metallurgical research to disentangle uranium and coal in the Springbok (Cape flats) coalfield, which will increase the country's reserve base of coal and uranium.

6.1.2 URANIUM AND THORIUM

Uranium is mainly used to fuel commercial nuclear power plants. South Africa is currently exporting uranium in its oxide form (U_3O_8), the first stage of beneficiation and imports the enriched uranium from the northern hemisphere for power generation purpose. This is due to the closure for uranium beneficiation operations due to the obligations of the Non Proliferation Treaty (NPT) signed by South Africa in 1991. The recent increase in energy demand in South Africa has prompted re-assessment of alternative primary source of energy, hence increasing the demand for uranium as the clean alternative mass power production. South Africa has gained expertise over many years in the beneficiation of uranium from the mining of the ore to producing uranium for power generation and beyond. Meanwhile researchers have been exploring the possibility of using thorium as an alternative fuel for nuclear reactors. Thorium is speculated to be approximately three times more abundant than uranium. However present knowledge of distribution of thorium resources is poor due to relatively low key exploration efforts arising out of

insignificant demand. Preliminary research indicates that the prospects of using thorium as an alternative fuel for reactors are positive but for the moment, the uranium boom still continues.

With the commitment of government to build nuclear power stations to compliment the fossil fuel based electricity, preparatory work for beneficiation of uranium/thorium and other minerals sought, such as fluorspar and others is critical.

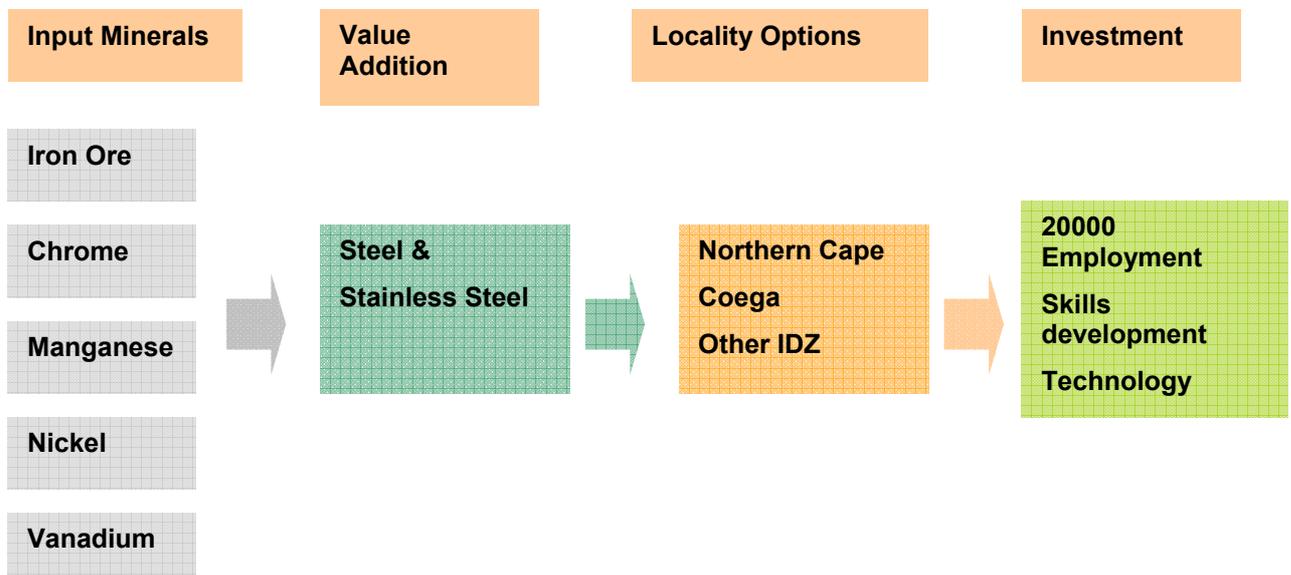
The KAP's for the successful implementation of nuclear power generation:

- a) Quantification of uranium and/or thorium reserves and resources in the country
- b) Ascertain the economic feasibility of re-establishing uranium enrichment
- c) Plan for comprehensive waste treatment and mine rehabilitation
- d) Finalisation of the uranium policy

6.2 IRON AND STEEL

Various government departments have combined efforts to create an enabling environment for the development of steel and stainless steel plants in South Africa. Access to iron ore, as well as manganese, chromium, nickel and vanadium, are essential for the projects identified through this process to be viable and to enable the new facilities to compete with existing players. The development of the plants would also assist in creating an environment for competitive pricing in the domestic market. The challenge for the interdepartmental team is to facilitate the beneficiation of these ferrous minerals to the final stages of the value chain, as outlined in the figure 2 below

FIGURE 2: IRON AND STEEL STRATEGIC OUTCOME



A coastal stainless steel plant producing predominantly ferritic grades and/or the 200-series (where Manganese is used instead of Nickel) should be investigated, as it would not only increase the level of ferro-chromium beneficiation, but would also enhance competitive pricing to downstream fabricators. Affected parties have agreed on a baseline level for chrome beneficiation, identified as ferro-chrome.

The key action plans (KAP) for iron and steel value chain development:

- a) Encourage investment into South African steel industry to break anti-competitive pricing by the current operators. This process should include investigation of the establishment of favourable trading conditions on ore to improve local access to the required minerals for local consumption as well as the use of existing versus new incentives. The Mineral and Petroleum Resources Royalty Bill (3rd draft) supports the processing of the ferrous ores into alloys; however the challenge is to encourage investment beyond alloy production. It will be necessary, therefore, to ensure that the resources that are required for any new plants that are established are accessible.
- b) There is recognition that there are pricing challenges in the iron and steel industry which may be emanating from anti-competitive players.

6.3 PIGMENT AND TITANIUM METAL PRODUCTION

The development of the titanium value chain (i.e. production of titanium pigment, metal and downstream fabrication) is a potential key growth area for South Africa. An inter-departmental task team has been formed to advance the beneficiation of titanium and the establishment of titanium industry in South Africa.

In order to support this process the following KAP's could apply:

- a) The funding of fundamental research into the production of titanium from the Bushveld titanomagnetites. Such a facility would also be a major iron producer which could facilitate competitive pricing of steel.
- b) The development of a more cost effective and proprietary primary titanium metal production process is seen as a key enabler for the establishment of a South African titanium industry.
- c) The continued development and commercialisation of technologies to compete cost effectively in the international market

- d) The development of an infant titanium industry. This includes the required infrastructure to support South Africa's entry into the titanium market, commercialisation of existing technologies and the development of human capital to sustain a future large-scale industry.
- e) The development and demonstration of an advanced investment casting capability for titanium alloys. Further projects are proposed to develop key technology platforms and establish local competence and capacity in areas like powder metallurgy of titanium, machining etc.
- f) Commitment by the mining companies with respect to ensuring access to minerals is critical for growth. Continued discussion with the major pigment producers around the world to ensure that government (DTI, DME, DST and other stakeholders) know what all of their requirements are to set up a plant in South Africa.
- g) It is also worth investigating the viability of establishing a new chlorine capacity in conjunction with a pigment plant. A second stage would be to establish titanium metal production on the back of titanium tetrachloride for pigment production, followed by titanium metal fabrication for the aerospace, automotive, leisure and medical sectors.
- h) Continued R&D with respect to mineral beneficiation, the preparation of intermediate metal salts, purification thereof and metal manufacturing itself.

6.4 AUTOCATALYTIC CONVERTERS AND DIESEL PARTICULATE

Relevant government departments should jointly look at ensuring the expansion of autocatalysts and diesel particulate filters manufacturing in South Africa, as part of a beneficiation output for PGM. This would be done through an existing committee, the PGM Beneficiation Committee (PBC), comprising of government, business (mining and manufacturing) and labour.

The following KAP's could be required for the project to succeed:

- a) Commitment from the PGM mining sector to ensuring that the required resources for this expansion would be made available in the country. The major mining companies have so far demonstrated their readiness to advance beneficiation in the country by initiating and fully participating in the PBC.
- b) Develop the modalities for the development of local metal access mechanism through an agreed approach between government and mining houses. The amendments to the MPRDA make provision to strengthen mineral beneficiation by encouraging mining companies to supply feedstock to local beneficiators.

- c) Unlocking intrinsic value within PGM sector through research programmes. This could be done through industry sharing forums, and formation of international partnerships. In addition, technology upgrades (recapitalisation) for R&D Centres of Competence, as indicated in the Advanced Metals Strategy, would be supported.
- d) The alignment of existing initiatives on skills development as well as promotion of careers in related fields.
- e) The promotion of investment in the automotive industry and the continuation of the sector incentive, such as the Automotive Production and Development Program (APDP). Instrument specific incentives would be considered and developed if applicable.

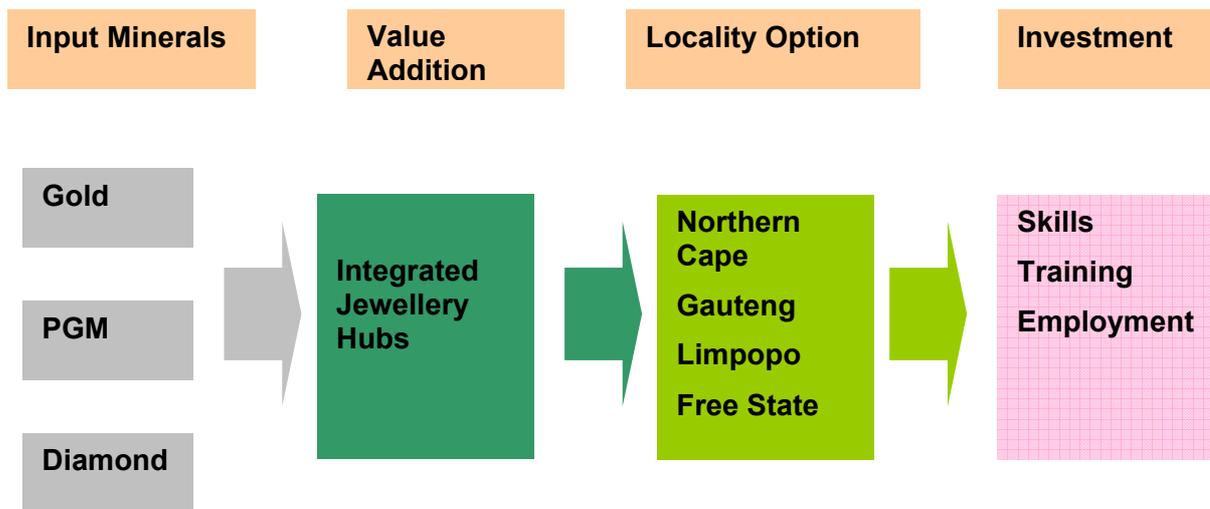
6.5 DIAMOND CUTTING AND POLISHING AND JEWELLERY FABRICATION

The beneficiation of gold and diamonds requires the establishment of Integrated Jewellery Hubs throughout the country (figure 3). Although the fabrication of platinum jewellery is not a priority area for platinum group metals (PGM) beneficiation, the integration of specialised platinum jewellery facilities into any of the Jewellery Hubs would be well received.

The high value and low bulk of gold, platinum and diamond jewellery lends itself to export markets such as the United States of America (USA), Japan and Europe. The African Growth and Opportunity Act (AGOA), which provides access to markets in the USA gives an opportunity for local beneficiaries to grow their markets internationally. In addition, there exists free trade area with the European Commission (see "*Trade, Development and Cooperation Agreement, or TDCA*"), which provides for duty free access into the EC. At the same time, South Africa is renegotiating the offer that SA made to the EC in the 90's with regard to a number of jewellery lines in terms of which the duties on these products are supposed to be liberalized by 2012.

- 7113 11, 7113 19, 7113 20 (articles of jewellery and parts thereof, of precious metal or of metal clad with precious metal): to freeze at current TDCA level (i.e. 10%) - to restart phase-down in 2011 - to fully liberalize in 2015.
 - 7114 11 90, 7114 19 90, 7114 20 90 (articles of goldsmiths or silversmiths wares and parts thereof, of precious metal or of metal clad with precious metal): to freeze at current TDCA level (i.e. 10%) - to restart phase-down in 2011 - to fully liberalize in 2015.
 - 7116 10, 7116 20 (articles of natural or cultural pearls, precious or semi-precious stones): to freeze at current TDCA level (i.e. 10%) - to restart phase-down in 2011 - to fully liberalize in 2015.
- 1 jewellery line (7115 90 30 - other articles of precious metal or of metal clad with precious metal) is currently free under TDCA but should be, according to SA, at 10% in the TDCA in accordance with all the other lines of the Chapter. And SA would request to freeze 7115 90 30 at the level of 10 % - to restart phase-down in 2011 - to fully liberalize in 2015.*

FIGURE 3: PRECIOUS MINERALS STRATEGIC OUTCOME



Key action plans for jewellery could include:

- a) The establishment of an applicable and effective metal advance scheme aimed at ensuring local metal/mineral access for local value addition. The feasibility of this mechanism has been proven internationally and is being applied successfully on a small scale in the PGM sector. Government would need to investigate the reasons for less than adequate access in the gold sector in South Africa and identify issues that should be addressed to implement the scheme successfully.
- b) A structured training programme which takes into consideration current specific demands and the expansion of the jewellery industry could be developed in collaboration with the Mining Qualifications Authority (MQA) and relevant SETA's.
- c) Jewellery investment promotion, including the promotion of existing incentives in the jewellery sector. An analysis of a new capital redemption legislation to encourage investment into the industry should also be conducted and instrument specific incentives considered. The development of Jewellery Hubs in Industrial Development Zones would also put South African companies at almost the same level as their competitors in other countries that have prioritised diamond cutting and polishing and jewellery manufacturing.
 - Commitment from Industry to grow the gold jewellery sector through their own facilitative interventions and promote the use of gold in South Africa. In terms of the broad Based Socio Economic Empowerment Charter for the Mining Industry, mining companies can offset part of their equity ownership against beneficiation.

- d) Second economy interventions such as the Kgabane Jewellery project, the Olifantsfontein Jewellery Training and Manufacturing facility, the SEDA Platinum Incubator, as well as all private sector initiatives could contribute significantly towards furthering the objectives of this Strategy in relation to diamond and jewellery manufacturing. These initiatives must be prioritised and provided the necessary support for further development.

7. CONCLUSION AND RECOMMENDATIONS

South Africa's balance of payment has, for many years, been skewed in favour of trading countries as a result of South Africa's raw mineral export orientation and importation of manufactured products. Given the heritage of mining in this country, coupled with the concept of "mineral resources are limited, but creativity is unlimited" the time has never been more opportune for a more coordinated growth in mineral value addition. The beneficiation strategy is rooted in several policies, including the MPRDA, the BBSEE, Precious Metals Act and the Diamond Amendment Act. In addition, this strategy seeks to fundamentally transform the industry from being largely resource based to knowledge base. It also compliments programs of Government, such as the NIPF, energy security, AsgiSA, JIPSA, BBSEE and others

As South Africa develops towards a more coordinated industrialisation era, underpinned by the National Industrialisation Policy Framework (NIPF), the role of the country's mineral commodities as input materials will be even more significant in a short to medium term. The NIPF will be achieved at a significant premium, if the bulk of the input materials are not sought from the country's production. The energy supply deficit experienced in the first quarter of 2008, albeit with subsequent attainment of a rather fragile stability in energy supply, presented opportunities for beneficiation of minerals (and gases) intended at prolonging the provenance of the country's fossil fuels, aimed at compliance with Kyoto protocol obligations and reducing the cost of doing business in South Africa.

The beneficiation strategy for the minerals industry of South Africa proposes a co-ordinated approach to encouraging the increase in the beneficiation of minerals, through the development of specific value chains. While a few value chains are proposed in this strategy document, namely energy generation, steel and stainless steel fabrication, pigments and super alloy production, and jewellery manufacturing, they are intended to indicate the inherent value for South Africa in embracing beneficiation for all mineral commodities. Through this strategic intervention, there are direct and indirect benefits for South Africa. South Africa's employment

and diversification gains will only be achieved if these value chains are extended to the last stages of the value chain, where co-ordination is also critical.

The fiscal and regulatory environment must support the development of the selected value chains to ensure successful implementation of the strategy. In this regard, the finalisation of relevant legislative policies will enable smooth implementation of various strategic activities identified in this document. The diamond industry can be viewed as a pilot for setting aside part of the production for local consumption as it has led the way through the establishment of the State Diamond Trader. On the basis of this model, the PGM downstream beneficiation study has proposed setting aside a portion of their production for local consumption and this can demonstrate the confidence expressed by the industry on the viability of the model. Mining companies can also off-set part of their BEE percentage compliance based on a formula per commodity stream, which considers the extent of beneficiation support after promulgation of the MPRDA. Other regulatory consideration will consider export duty on some mineral ores/concentrates, in line with the trade policy which is currently being developed by the Dti, based on the outcome of cost benefit analysis, analogous to the diamond export duty.

A number of commodity value chains consume large quantities of electricity. The bulk of these value chains are also emitters of gasses and heat, both of which can be captured and recycled to generate up to 80% of the operation's energy needs, with only the balance being sourced from the national grid. Establishment of such plants requires State encouragement and support as it will not affect the currently fragile energy supply.

The cross-cutting constraints to beneficiation in South Africa require implementation of various interventions (KAP) by Government and Business alike. The risk of not implementing the beneficiation strategy is too high for the country.

The synopsis highlights critical areas of intervention that will ensure a seamless and effective implementation of a coordinated implementation of beneficiation of South Africa's mineral commodities. This includes, albeit not limited to:

- Regulatory incentive: The beneficiation off-sets against the Mining Charter's requirement for 26% BEE ownership is a major milestone towards creating an enabling environment for value addition, as embedded in Section 26 of the MPRDA. However, there's scope for establishment of favourable trading conditions (such as use of export/import levies, where necessary) on ore to improve local access to the required minerals for local consumption as well as the use of existing versus new incentives.

- Mineral Royalty Bill incentives present a further intervention opportunity to stimulate local beneficiation of South Africa's minerals.
- Investment in research and development initiatives, which will be aimed at unlocking the intrinsic value of South Africa's minerals through finding new products and/or technologies in support of local beneficiation
- Commitment by producers of minerals to support local beneficiation in terms of availing access to minerals in South Africa readily
- Alignment of existing initiatives on skills development to required proficiency for optimising beneficiation
- Ensuring security of energy supply through investment in new generation capacity, implementing energy efficiency measures and pursuing co-generation potential, where possible.
- Expanding South Africa's economic policy framework to ensure international market access to locally beneficiated goods

While the above critical areas of intervention are neither exhaustive nor listed in any order of priority, they are intended to highlight crucial areas of intervention sought by all industry stakeholders in support of a well coordinated beneficiation initiative. The beneficiation initiative presents one of the rarest opportunities for South Africa to continue sustainable growth of its economy beyond mining.