KWAZULU-NATAL MINERALS BENEFICIATION STRATEGY

Developed by:

The KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (EDTEA)

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FOREWORD

The national government of South Africa has identified mining as one of the economic drivers in the country. This is evidenced by the fact that the National Development Plan (NDP) singles out mining as one of the six priority sectors that have the potential to take our economy to new heights of growth. In particular, the NDP acknowledges that minerals beneficiation or downstream production can raise the unit value of South African exports contributing to job creation in the country. The beneficiation opportunity has been well articulated in a number of policy documents at the national level, which recognise that the highest job creation and value-addition occur at the end of the value chain. Exporting un-beneficiated ores and semi-finished products therefore represents an export of jobs, as well as having a negative effect on the balance of payments, when finished, high-value products are imported back into South Africa. Furthermore, unstable commodity prices and currency markets put mining jobs and revenue at risk, whilst businesses relying on imported semi-finished or finished materials also face a number of risks. Increased domestic control of mineral value chains can mitigate some of these challenges, as well as provide development opportunities for the long term.

In line with the government's objective to use mining as a springboard for economic growth, a national minerals beneficiation strategy was developed in 2011. The strategy focuses on addressing the numerous constraints facing the minerals industry, including the monopolistic pricing of mining companies, uncompetitive and costly infrastructure, limited value chain linkages, inadequate technology and limited Human Resource Development (HRD). However, the strategy prioritises minerals that exist in abundance nationally, leaving certain minerals that may be key to unlocking provincial growth prospects.

As such, as the province of KwaZulu-Natal, we have taken a deliberate step to develop a strategy that focuses on the particular set of mineral endowments and value chain opportunities in KwaZulu-Natal. This is required so that targeted and relevant interventions can be identified for mineral value chains in KwaZulu-Natal, allowing for a deliberate strategy to realise the potential opportunities of increased minerals beneficiation in KwaZulu-Natal. The strategy brings together the private sector, municipalities, and provincial government to advance coordination and synergise mineral beneficiation activities of all stakeholders in the province.

This is the first time that the question of beneficiation is being looked at from a provincial economic development perspective. The province of KwaZulu-Natal is no stranger to mineral beneficiation. To name a few: not only does it host the smelting of heavy mineral sands mined in the province, production of steel and phosphoric acid from mineral concentrates railed in from other provinces – it even hosts a world-scale aluminium plant which beneficiates alumina mined and processed in Australia. The provincial strategy document interrogates issues such as how best can the provincial economy derive more benefit from the mineral endowments in the province; the role of infrastructure, such as rail, sea ports, or power lines in minerals beneficiation; the role of skills development; and the linkages between beneficiation and manufacturing.

It is my pleasure to present the KwaZulu-Natal Minerals Beneficiation Strategy that will help to drive the minerals sector in the province towards a more profitable, socially accountable and environmentally sustainable future. I therefore urge all concerned stakeholders in the province, particularly, the private sector, municipalities and the education sector to embrace the strategy to ensure its effective implementation.

Mr Sihle Zikalala

MEC for Economic Development, Tourism and Environmental Affairs

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LIST OF ACRONYMS

AfDB	African Development Bank
AMI	Advanced Metals Initiative
ANC	African National Congress
AFSA	Aluminium Federation of South Africa
ASEAN	Association of Southeast Asian Nations
CGS	Council for Geoscience
COGTA	Department of Co-operative Governance and Traditional Affairs
CSI	Corporate Social Investment
DMR	Department of Mineral Resources
DSBD	Department of Small Business Development
the dti	The Department of Trade and Industry
DWS	Department of Water and Sanitation
EDD	Economic Development Department
EU	European Union
GDP	Gross Domestic Product
HRD	Human Resource Development
IBSA	India Brazil South Africa
IDC	Industrial Development Corporation
IDS	Industrial Development Strategy
IDZ	Industrial Development Zone
IPAP	Industrial Policy Action Plan
KZN	KwaZulu-Natal
KZN EDTEA	KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs
MPRDA	Minerals and Petroleum Resources Development Act
MTBPS	Medium Term Budget Policy Statements
OECD	Organisation for Economic Co-operation and Development
OEM	Original Equipment Manufacturer
PBC	Platinum Beneficiation Committee
PGDP	Provincial Growth and Development Plan
PDGS	Provincial Growth and Development Strategy
PPC	Provincial Planning Commission
PSEDS	Provincial Spatial Economic Development Strategy
RBIDZ	Richards Bay Industrial Development Zone
RBM	Richards Bay Minerals
SAISI	South African Iron and Steel Institute
SBGE	Small Business Growth Enterprise
SEZ	Special Economic Zone

SIMS	State Intervention in the Minerals Sector
SMC	State Minerals Company
Stats SA	Statistics South Africa
TiCoC	Titanium Centre of Competence
TIKZN	Trade and Investment KwaZulu-Natal
TNPA	Transnet National Ports Authority
UDTs	Urine Diverting Toilets
UN	United Nations
UN DESA	United Nations Department of Economic and Social Affairs
USGS	United States Geological Survey
VUNA	Valorisation of Urine Nutrients in Africa
WG	Working Group

1. INTRODUCTION

This document presents a strategy to support increased minerals beneficiation in KwaZulu-Natal, with a view to the Province deriving maximum economic benefit and job creation from its mineral value chains in an environmentally and socially responsible way.

This chapter presents the context underpinning minerals beneficiation in KwaZulu-Natal, including the problem statement and background to the development of the strategy. Chapter 2 presents the vision and mission for the strategy, together with the strategic outcome-oriented goals and strategic objectives. A consideration of the pillars on which the strategic goals and objectives rest is also covered in this chapter. Chapter 3 describes the institutional arrangements, whilst Chapter 4 presents suggested activities and steps going forward. The final two chapters are concerned with the implementation of the strategy.

1.1 Problem statement

South Africa has been recognised as one of the wealthiest mining jurisdictions in the world, possessing approximately US$ 2.5 trillion in non-energy in situ mineral wealth (Deloitte, 2011). Despite this, only around 11% of the total volumes of base metals, precious metals and other minerals produced in the country are currently processed to higher value-added products (DMR, 2011). With a fair portion of this un-beneficiated mineral wealth either originating in KwaZulu-Natal (in the case of Mineral Sands) or passing through KwaZulu-Natal's ports, this represents significant missed opportunities for KwaZulu-Natal (as well as for South Africa as a whole). The beneficiation opportunity has been well articulated in a number of policy documents at the national level, which recognise that the highest job creation and value-addition occur at the end of the value chain. Exporting un-beneficiated ores and semi-finished products therefore represents an export of jobs, as well as having a negative effect on the balance of payments, when finished, high-value products are imported back into South Africa. Furthermore, unstable commodity prices and currency markets put mining jobs and revenue at risk, whilst businesses relying on imported semi-finished or finished materials also face a number of risks. Increased domestic control of mineral value chains can mitigate some of these challenges, as well as provide development opportunities for the long term.

A number of initiatives, such as the National Beneficiation Strategy (DMR, 2011) and the African National Congress' (ANC) State Intervention in the Minerals Sector (ANC, 2012), indicate a strong policy interest in increasing mining's value addition and development impact. These initiatives focus on addressing the numerous constraints facing the minerals industry, including the monopolistic pricing of mining companies, uncompetitive and costly infrastructure, limited value chain linkages, inadequate technology and limited Human Resource Development (HRD). The strategy developed here takes cognisance of these national initiatives, but focuses on the particular set of mineral endowments and value chain opportunities in KwaZulu-Natal. This is required so that targeted and relevant interventions can be identified for mineral value chains in KwaZulu-Natal, allowing for a deliberate strategy to realise the potential opportunities of increased minerals beneficiation in KwaZulu-Natal.

1.2 Methodology

The robust approach to promoting successful value addition to the minerals sector in KwaZulu-Natal prioritises five mineral commodities selected on the basis of their key strategic benefit to the province. This prioritisation of the five minerals does not detract from the potential that other important value chains hold and which may become the focus of future research. The strategy was developed over a number of phases:

1. Project scoping that framed and defined the tasks and scope of the studies to be undertaken to inform the strategy.
2. Background surveys that interrogated the status quo in the province in terms of activities and markets, and trends in the business and political climate in which the sector operates.
3. Analysis of the contribution of five selected mineral commodities in terms of their socio-economic development, and the risks and opportunities associated with these commodities.
4. Identification of advanced mineral beneficiation opportunities to define the value chains of the five mineral commodities selected for further analysis.

The research undertaken in Phases 2-4 involved significant stakeholder engagement, and was conducted via a combination of desktop research and interviews. Stakeholders interviewed included individuals from industry associations, businesses operating in the minerals and metals sector in KwaZulu-Natal, as well as nationally (where relevant), academic and government experts. The research also drew on surveys of international best practice, as well as national policy reviews. The outcomes of research are documented in six consolidated reports (Project Scoping and Background Surveys; Aluminium Value Chain; Iron & Steel Value Chain; Minerals Sands Value Chain; Phosphate Value Chain and Coal Value Chain), the executive summaries of which are included in Annex I.

The research underpinning the development of the strategy was augmented through a series of masters-level research projects that served the dual purpose of developing knowledge and assessment tools, as well as developing human capacity in areas of key relevance to the sustainable development of mineral resources. The masters-level research projects covered the following areas:

- Sustainability performance analysis and decision-making for minerals beneficiation;
- Economic impacts of minerals beneficiation on the provincial economy;
- Multi-stakeholder engagement for mineral beneficiation; and
- Community development around an Industrial Development Zone (IDZ).

1.3 Definitions

Mineral beneficiation is defined in this strategy as any transformation of a mineral commodity that adds economic value. This value-add can take place at any point on the value chain of the mineral commodity between mining of the ore and retail of the final product. Three broad stages in the value chain of a mineral commodity can be identified:

- **Mining:** the extraction of minerals, including concentration, separation or upgrading undertaken at or near the mine.

- **1st-level beneficiation:** the transformation of the raw material from the mine to yield a more valuable commodity material.
- **Downstream beneficiation:** all subsequent industrial activities that add economic value to the commodity material.

Mineral beneficiation in its narrow sense typically applies to 1st-level beneficiation, i.e. primary upgrading of the ore, e.g. smelting iron ore. Much of South Africa's mineral commodity exports are at this level, as exporting primary ores is typically more expensive due to their bulky nature. This beneficiation strategy explicitly covers the whole mineral value chain, as the higher value-add typically occurs in downstream beneficiation, e.g. the manufacture of automotive body parts. This wider definition is also important for a minerals beneficiation strategy for KwaZulu-Natal, as for many mineral commodities of relevance to KwaZulu-Natal, e.g. iron, aluminium and phosphate, the mining and 1st-level beneficiation does not take place in KwaZulu-Natal, but there is significant scope for increased downstream value-add as the partially beneficiated material comes through KwaZulu-Natal.

1.4 Situational analysis

The situational analysis provides the context against which the strategy has been developed. It includes consideration of global, national and provincial macroeconomic trends; a summary of the outlook for the minerals and metals markets; a brief introduction to the KwaZulu-Natal minerals sector; international examples of beneficiation strategies; and consideration of the policy context relevant to the strategy.

1.4.1 Global, national and provincial macroeconomic trends

The global economy appears to be slowly recovering from the 2008 financial crisis and the downturn of 2011/2012, but with a mere 2.4% growth projected for the world gross product in 2015, policymakers are still facing considerable challenges stimulating investment and reviving global growth (UN, 2016, National Treasury, 2016). Challenges holding back the world economy include "persistent macroeconomic uncertainties and volatility; low commodity prices and declining trade flows; rising volatility in exchange rates and capital flows; stagnant investment and diminishing productivity growth; and a continued disconnect between finance and real sector activities" (UN, 2016). The modest recovery in world gross product is expected to continue in 2016, with global growth predicted to reach 2.9%. However, particularly concerning for South Africa is that for the first time in over two decades growth is being led by recoveries in the world's most advanced economies, whilst the contribution to global growth from commodity exporters is declining sharply amid low commodity prices (World Bank, 2016).

Growth varies from region to region and within regions from country to country; with uneven impacts on South Africa's key minerals export markets. Within Sub-Saharan Africa, growth in 2015 was moderate, estimated at 3.4%, down from 4.6% in 2014 (World Bank, 2016). The forecast is for moderate recovery over the next two years, with growth in Sub-Saharan Africa forecast at 4.2% for 2016 (World Bank, 2016). Infrastructure projects continue to drive the demand for commodities and underpin much of the economic activity, although the decline in commodity prices poses a risk for fiscal and current account balances in the region. South-South trade, which has been of increasing importance in recent years, has been affected by the slowing import demand from large

emerging markets, particularly China and Brazil. This has particularly affected developing country exports. Currency depreciations have thus far shown only limited benefits for exports (World Bank, 2016).

The World Bank estimates South Africa's economic growth at 1.3% for 2015, marginally lower than 2014, at 1.5% (World Bank, 2016). Near term growth is predicted to be minimal, forecast at 1.4% in 2016 (World Bank, 2016). Internal estimates are even lower, with Treasury forecasting growth of just 0.9% for 2016 (National Treasury, 2016). Reasons for the underperformance relate to both global and domestic factors. Global factors include depressed commodity prices and slowed growth in major trading partners. Domestic conditions impacting on growth include the severe drought, policy uncertainty, falling business confidence as a result of protracted labour disputes, electricity supply constraints and regulatory barriers to investment (National Treasury, 2016). The inequality gap and high levels of poverty, driven by structural unemployment, remain persistent economic challenges.

With particular relevance to this strategy, the South African mining sector has been under serious pressure amid protracted labour disputes and major declines in demand for exports of platinum, gold, iron ore and coal (National Treasury, 2016). National Treasury's Medium Term Budget Policy Statements (MTBPS) in 2014 signalled the need for broader development impacts to be realised within the sector, particularly in relation to housing investment, social development and dispute resolution (National Treasury, 2014). However, continued labour disputes, limited electricity supply and depressed global demand and commodity prices resulted in the contraction of the mining sector in 2015 (National Treasury, 2016)

KwaZulu-Natal, as the second largest provincial economy in the country, contributed 16.1% to South Africa's GDP in 2014 (Stats SA, 2016a). KwaZulu-Natal is following the trends in the national economy, with growth in total economic output decelerating in recent years. KwaZulu-Natal recorded the third highest provincial real annual economic growth rate in 2014, tied with Gauteng, at 2.1% (Stats SA, 2016a). Youth unemployment (15-34 years) in KwaZulu-Natal was 33.4% in 2015, up from 30.5% in 2008, whilst adult unemployment (35-64 years) stood at 13.8% in 2015 (up from 12.8% in 2008) (Stats SA, 2015). The community and social services industry employed the most people in KwaZulu-Natal in 2013, followed by the trade industry, each employing over half a million people in 2013 (Stats SA, 2013). The manufacturing industry is also an important employment sector, contributing 13.9% to provincial employment in 2013 (employing 370,000 people). The mining and utilities industries employ the least number of people in KwaZulu-Natal, with 22,000 people employed in mining in 2013 (Stats SA, 2013).

Public infrastructure programmes, particularly the implementation of a number of flagship infrastructural development programmes identified in the Provincial Growth and Development Strategy (including the Durban dig-out port, the Durban-Johannesburg rail corridor, expansion of the Durban Trade port etc.), are intended to play a role in economic development and help offset the poor performance of manufacturing and mining. KwaZulu-Natal also has a crucial role to play in regional development and the fostering of closer economic ties with neighbouring states by virtue of both its geographic location and ports' infrastructure (KZN PPC, 2011a). The KZN province also currently hosts two of the five operational Industrial Development Zones (IDZs) in the country, viz. Richards Bay and Dube Tradeport.

Overcoming a number of constraints – not unique to the province – is essential if KwaZulu-Natal is to realise this potential and ensure that existing economic opportunities are realised to the benefit of all the people in the

region. These constraints include poverty, youth under-development, lack of social cohesion, gender imbalances and family discordance due to high death rates (KZN PPC, 2015). Infrastructure backlogs, in areas such as water, electricity, sanitation, roads, housing, primary health care, etc. also need to be addressed. Improvements are also necessary in the quality of infrastructure services, at the local level in particular (KZN PPC, 2011a). Skills shortages in particular are a major growth and development constraint across all sectors in South Africa, and within the province. A lack of skills is a consideration when exploring the potential presented by the downstream beneficiation of minerals, and is particularly acute in KwaZulu-Natal with inadequate numbers of students graduating in the fields of Science, Engineering and Technology. Ensuring rapid skills development and acquisition will be a necessary condition for realising the economic development potential of minerals beneficiation in the province.

1.4.2 Minerals and metals market outlook

Despite the global recovery in the demand for commodities after 2000, driven largely by infrastructure developments in China and India, South Africa's infrastructure limitations (particularly rail and energy) inhibited the country's ability to capitalise on this recovery. The last decade has seen relatively little growth in the country's mining industry, with jobs increasing from 456,000 in December 2004 to a high of 534,000 in June 2012 (Stats SA, 2006, Stats SA, 2014). The last four years have seen significant losses in global market share and real employment, with jobs dropping to 462,000 in December 2015 (Stats SA, 2016b) This decline has continued amid worsening global market conditions. The underperformance of the mining sector can be attributed to much the same range of factors identified above as limiting national economic growth (policy uncertainty, electricity shortages, infrastructure bottlenecks, water scarcity and skills shortages, amongst others).

Since 2012, primary commodity prices have experienced downward pressures (AfDB, 2015) as a result of substitution, supply side growth and falling demand in China. Metal prices reached their lowest levels in more than six years in November 2015, reflecting well-supplied markets and weak growth in major emerging markets (World Bank, 2016). These conditions look set to remain in place in coming years, setting the scene for a protracted period of low commodity prices. Metal prices are likely to edge up in the range of only 1 to 2% (World Bank, 2016). This has serious consequences for South Africa and the Sub-Saharan region, more broadly, which rely strongly on metal exports for foreign currency earnings. The World Bank (2016) estimates that fuels, ores and metals accounted for 60% of Sub-Saharan Africa's total exports in 2010-2014, compared with 16% for manufactured goods, thereby making the region particularly susceptible to commodity price shocks (World Bank, 2016). The declining growth rates for South Africa and the Sub-Saharan region as a whole, cited above, are testament to this. On the other hand, low commodity prices potentially create a driver for increased domestic beneficiation rather than exporting un-beneficiated materials at low prices. Other emerging global geo-political developments likely to impact markets for beneficiated minerals in the long-term are summarised in Table 1.

TABLE 1: GLOBAL GEO-POLITICAL DEVELOPMENTS AFFECTING MINERALS BENEFICIATION IN SOUTH AFRICA

Development	Direction of impact	Explanation
Emergence of new centres of economic growth,	Negative	With strong domestic developmental agendas, Asian powerhouses, especially China, have strong mandates to maximise their own industrial

especially in Asia		development and are likely to use international trade agreements to remove or limit any constraints on raw material export from resource rich countries that would hurt their own beneficiation ventures.
Higher logistics costs	Positive	Increased transportation costs will favour trade of materials and products with higher densities vs. bulky raw materials.
Increased industrialisation of many areas of the world, including resource rich countries	Positive	Global demand for minerals commodities to support increased industrialisation is rising, stimulating export markets for South African resources. In addition, South Africa's own industry, which is recording positive growth (though this remains well below its potential), especially in the construction and manufacturing sectors, represents one of the most important demand pulls for increased minerals beneficiation.
Carbon reduction initiatives	Positive	The transportation of finished product could potentially lead to lower carbon emissions as compared to the transportation of bulk ores.

Source: Adapted from Deloitte (Deloitte, 2011).

1.4.3 The minerals sector in KwaZulu-Natal

KwaZulu-Natal makes a relatively small contribution to the national mining and quarrying sector, at 3.5% of value added in 2014 (Stats SA, 2016a). Mining and quarrying made up just 1.6% of provincial GDP in 2014 (compared to 7.5% nationally) (Stats SA, 2016a), whereas manufacturing's contribution to provincial GDP is above the national contribution (contributing 16% to provincial GDP in 2014, compared to 12% nationally) (Stats SA, 2016a). Minerals and metals still account for a large portion of the province's commodity exports, even though the mining of the material generally does not take place in KwaZulu-Natal (with the exception of mineral sands). The top export commodities in 2014 were motor vehicles (18.3%), raw aluminium and aluminium plates (16,5%), iron and steel (12.6%) and ores, slag and ash (11.9%) (KZN EDTEA, 2015). Within the manufacturing sectors, aluminium, mineral processing and motor vehicle manufacturing are all important subsectors which create a strong demand for components, an increasing proportion of which are now being sourced domestically (KZN PPC, 2011a) .

The province's trade and transport infrastructure gives it a distinct competitive advantage over other locations when it comes to trade in commodities. The port of Durban is the busiest container port in Africa, and Richards Bay is one of the largest bulk cargo ports in Africa. Significant capital investments and related infrastructure planned in these ports are intended to enhance the competitive advantage of the region and provide additional economic opportunities.

A detailed status quo assessment[1] was undertaken as part of the background research to the development of the strategy. The assessment considered the province's performance across a range of current mineral industries and provides details on their characteristics as well as current markets for their products. The analysis included the following mineral commodities, identified as relevant to KwaZulu-Natal: mineral sands, ferroalloys, iron and steel, aluminium, coal, phosphorus, dimension stone, gold, clay and brick, refractories, and sand and aggregate. The status quo analysis yielded the following high-level conclusions:

- KwaZulu-Natal's substantial natural endowments in **mineral sands** provide a competitive advantage, as does the existing industrial complex in Richards Bay and surrounds (as the seat of the world's largest

[1] Available as a separate report. See Annex 1 for the Executive Summary of this report.

sand mining and mineral-producing operations (KZN PPC, 2011a)). Furthermore, the potential for new markets for this mineral group is high.

- **Ferroalloys, aluminium, iron and steel** and **phosphorus** take advantage of KwaZulu-Natal's port and rail infrastructure, and, even though the mining does not take place in KwaZulu-Natal, secondary industries are well established in the Province. Richards Bay is the country's centre of **aluminium** industry operations, producing around 1.5% of the world's aluminium in 2014 (USGS, 2015).
- **Limestone, clay and brick** and **sand and aggregate**, sustain strong local industries. However, these are largely reliant on provincial demand and do not offer significant potential for growth.
- **Coal** and **gold** have declining reserves, which are very small in the national context. **Gold** is likely to remain a small niche player, with limited potential for expansion. For **coal**, the type of reserve is of relevance to its potential - increasing focus on 'green energy' raises questions regarding the future potential for KwaZulu-Natal's thermal coal production. However, KwaZulu-Natal has South Africa's only major anthracite reserves, and as such, potential exists for niche anthracite markets, particularly those taking advantage of linkages to minerals processing in the Province (most notably mineral sands, iron & steel and ferroalloys).

The preliminary findings of the status quo analysis were borne out by a related research piece, which found strong linkages between the beneficiation of aluminium and iron and steel in KwaZulu-Natal and downstream manufacturing industries in the Province. This work highlights the potential economic and welfare gains that would stem from increased beneficiation in these sectors[2] (Hearn, 2015).

Based on the status quo analysis, five mineral commodities – mineral sands, iron and steel, phosphorus, aluminium, and coal – were analysed further because of their perceived beneficiation potential for KwaZulu-Natal[3]. These commodities and their value chain opportunities form the pillars of this strategy, and are described in Section 2.5.

1.4.4 Learnings from international experience in promoting increased resource beneficiation

The beneficiation experience and performance of other countries can be drawn upon to inform KwaZulu-Natal's approach to supporting growth in minerals beneficiation. Some of the high level learnings from other countries are presented here.

In Africa, some of the learnings that are relevant are those from Nigeria and Botswana (Flanagan, 2013). In Botswana, specific measures in the De Beers mining lease, such as developing the local diamond cutting industry, and the coordinated tax and infrastructural support programme are identified as being factors that support increased beneficiation in that country. Nigeria's Local Content Act (2011) (Gelb, 2010), which requires local backward linkages from the oil sector, is an example of how policy tools and instruments have developed towards increased value add over time. A **coordinated interdepartmental programme** to develop the linkages between the commodities sector and the wider economy is thus identified as a critical factor in the successes achieved by both Botswana and Nigeria (Flanagan, 2013). In other countries in Africa, including Angola,

[2] The study uses the province's social accounting matrix (SAM) and the associated Leontief multipliers (Hearn, 2015)
[3] Available as separate reports. The executive summaries of the five value chain analysis reports are provided in Annex I.

Tanzania, Zambia, Ghana and Gabon, poor inter-governmental coordination, corruption and limited private sector cooperation are cited as some of the factors that are limiting the extent of beneficiation of resources (Flanagan, 2013).

Outside of Africa, Chile, Indonesia and Malaysia, all being resource rich countries, have managed to achieve significant levels of economic diversification (Gelb, 2010). A number of key factors that have led to these achievements have been identified. These include the **capacity of the governments** to manage and reduce the impacts of macroeconomic volatility associated with swings in export prices; **strong human and institutional capital**; an **export focus** with a diversification of export industries; and **strong participation** from constituencies outside of the minerals sectors. Furthermore, in each of these three countries, governments were able to put in place **multi-stakeholder development compacts** where all sectors of society shared a strong development vision and could be drawn upon to work together towards meeting this vision.

Finally, policy levers are often used to support the traded sectors, and infrastructure investments, tax and tariff relief, and special zones help reduce labour costs (Gelb, 2010). Related to these observations, the ANC's 2012 State Intervention in the Minerals Sector (SIMS) also identifies Sweden and Finland's economic and minerals governance as successful examples of **successful government coordination** to support minerals beneficiation. In those countries minerals governance was placed within or under economic governance, which established in a clear manner the most important objectives for the sector (such as industrialisation and employment creation) (ANC, 2012). The importance of **strong institutional frameworks**, with full legal backing, to guide the detailed functioning of the respective sector and its role in the wider economy, was emphasised by the Organisation for Economic Co-operation and Development (OECD) in their recent study on the advantages and disadvantages of export restrictions in the trade of raw materials (OECD, 2014). It was, however, also recognised that the institutional arrangements vary for the different countries, highlighting the importance of avoiding a one-size-fits-all approach to the governance issue. The need to take into consideration country and commodity-specific obstacles and enablers in developing strategies and action plans for promoting minerals beneficiation was emphasised at special task force meetings hosted by the South African National Research foundation and Institute for African Alternatives in November 2014 and April 2015.

The issue of **competitive input or feedstock pricing** is considered to be one of the most important mechanisms for stimulating downstream beneficiation in South Africa. The SIMS report (ANC, 2012) identifies examples of how competitive pricing has come to exist in other countries:

- Export tariffs on raw mineral products. These have been used in China, Venezuela, Zambia, Russia, India, Indonesia, Mexico, Mongolia, Canada, Turkey and most OECD states.
- High enough domestic steel demand due to the size of the country (Brazil, China), or as a result of membership of trading blocs (EU, Mercosur, ASEAN).
- Existence of state steel companies (as in China, Finland, Brazil, Sweden, and Norway).
- Restrictions on scrap exports, as in the case of China, India, Russia and Sweden (prior to joining the EU).
- State control of fertiliser production. In Norway and Finland developmental prices were achieved for nitrogenous fertilisers to support agriculture and agro-processing, which possess significant job creation potential.

It should, however, be noted that the OECD (2014) study on export restrictions has shown that, although used extensively to promote local beneficiation in emerging and developing countries, export-restraining measures and policies (including export permits, export taxes and quantitative restrictions) do not necessarily benefit downstream industries or enhance the domestic value-adding process. In Zimbabwe, for example, placing restrictions on the export of unrefined chrome ore, in an effort to develop local refining capacity, cost the country millions in revenue and resulted in the closure of mines and massive job losses (Bamieh, 2014).

In countries such as Sweden, Finland and the United States **clusters** have emerged, which have enabled the application of **skills and creativity** to realise value from mineral assets. There is also a transfer of the experience from these clusters into a range of other activities (Walker and Jourdan, 2003). A positively reinforcing cycle of growing skills, creativity, and knowledge application has thus been established in these countries, which allowed for increased value add for both the target resource and for other resources in the economy. A second factor identified as critical to the formation of successful clusters was "a culture of commitment and co-operation at the national and local level … with regard to maintaining and enhancing productivity and technological innovation" (Walker and Jourdan, 2003). **Education, skills, cooperation, and innovation** across private and public sectors at a national and sub-national level is thus identified as being critical (Walker and Jourdan, 2003, Blomstrom and Kokko, 2002).

In summary, the following are the lessons that can help to inform increased minerals beneficiation in South Africa in general and in KwaZulu-Natal in particular:

- **State involvement is necessary** to realise significant beneficiation. In other words, beneficiation cannot be expected to happen by itself if left to market forces alone. Local context, including timing, determines which levers are best utilised to assist with the beneficiation process and these can change over time in response to different local and global political-economy developments. A beneficiation programme is not a short term, quick win intervention. It is a long term, cooperative programme that should ideally be flexible and adaptable. All the international examples point to a long evolution of policy and strategy to support beneficiation efforts.
- Significant **coordination within and across government is required** to allow for coherent strategy and implementation. Successful examples are Finland and Sweden, where minerals governance was located within economic governance, and Botswana and Nigeria, which have strong interdepartmental programmes.
- **Cooperation is key** in supporting beneficiation. In Malaysia, Indonesia and Chile national development compacts set a broad national agenda that was supported across stakeholder groups and could therefore be driven and implemented with substantial support. Beyond a national compact, partnerships, not just between government and industry, are identified as important elements in a long term development endeavour. Partnerships include those with education and technology institutions and industry bodies, as well as government and its different agencies and spheres. In certain instances clusters have emerged in response to a significant focus on targeted industries.
- Perhaps the lesson that emerges most strongly is the **focus on developing human capital** through appropriate (mainly public) institutions of education, skills, and technology (including innovation). Finland and Sweden provide particular examples of strong public institutions of

education that support skills development. Skills and technologies were transferred to other industries leading to innovation and establishing global leadership in certain fields. The international examples reviewed underscore the importance of a network of cooperative institutions that can support excellence in skills, education and technology development and acquisition.

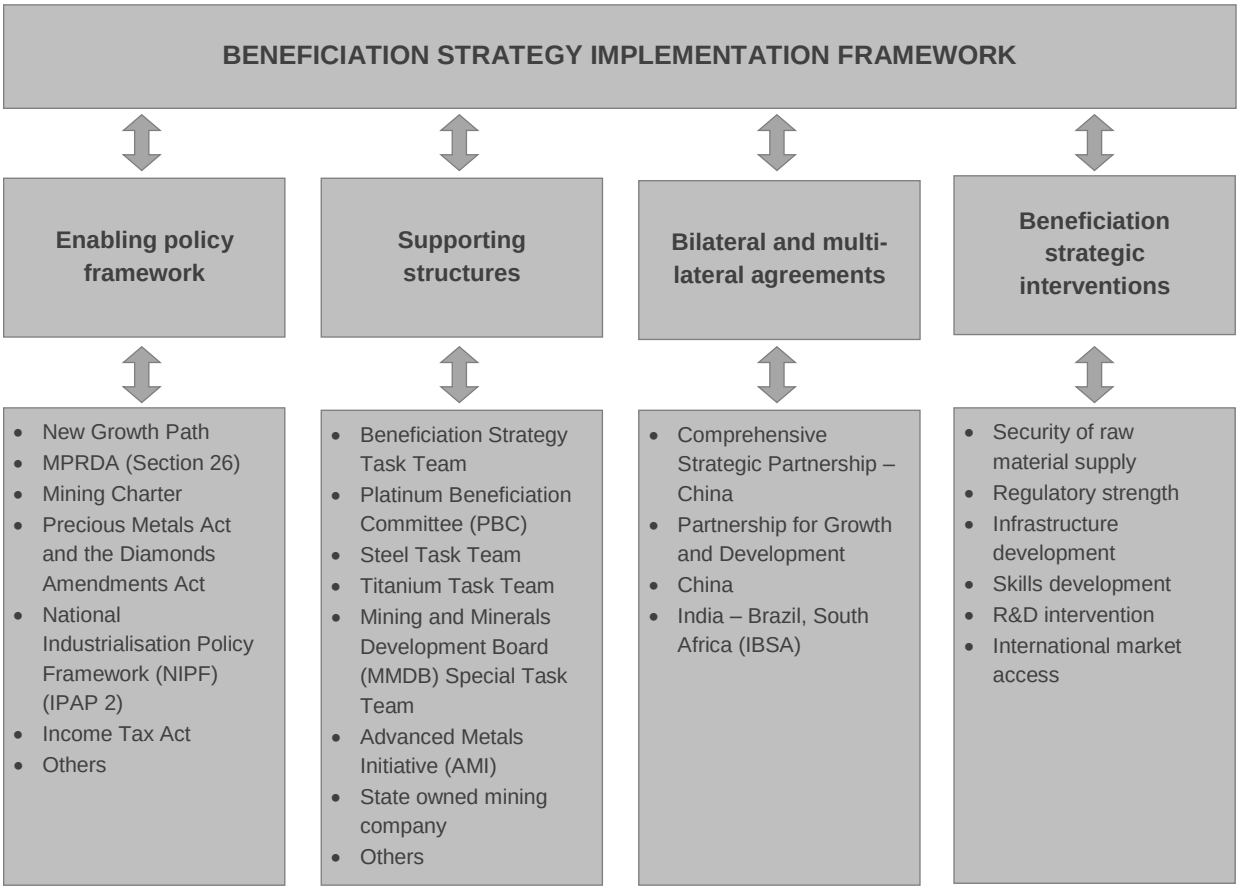
1.4.5 Policy alignment

A range of policies, strategies and legislation in South Africa has bearing on minerals beneficiation[4]. A review of the many policy documents and initiatives was undertaken as part of background survey for the strategy development[5]. A more recent initiative is the Mining Phakisa, which aims to realise Government's drive to achieve more value from South Africa's mineral resources. The Mining Phakisa is part of Operation Phakisa, an initiative by National Government to target key national issues following the Big Fast Results Methodology[6] (an innovative, results-driven approach, involving the setting of clear plans and targets, on-going monitoring of progress and with a focus on bringing together stakeholders from the public and private sectors, academia as well as civil society organisations). The Mining Phakisa is focussing on five value chains: Platinum group metals, iron & steel, titanium, polypropylene and capital equipment for the mining sector (Makhubela, 2016).

Of the national policies, the most relevant is the comprehensive National Beneficiation Strategy, published in 2011, which was to be followed by a Beneficiation Action Plan[7]. The National Beneficiation Strategy is a high-level policy document aimed to bring the ratio of beneficiated to primary products exported more in line with the potential suggested by the quality and quantity of South Africa's mineral resources endowment (DMR, 2011). The strategy is anchored in a number of minerals' related policy documents and is meant to align with the national industrial policy framework. Overall, the National Beneficiation Strategy is to be implemented through four main building blocks, as depicted in Figure 1.

[4] National level documents include the Beneficiation Strategy, the Industrial Policy Action Plan (IPAP), the Minerals and Mining Policy of South Africa, the Minerals and Petroleum Resources Development Act, the Precious Metals Act, the Mining Charter, the Industrial Development Zones Programme, the New Growth Path, the National Development Plan, and the Special Economic Zones Act. On a provincial level, documents include Provincial Growth and Development Strategy, the Provincial Growth and Development Plan, the Roadmap to KZN Recovery and Jobs and the KZN Export Strategy.
[5] Available as a separate report. See Annex 1 for the Executive Summary of this report.
[6] The Big Fast Results methodology is a results-driven approach through which the Malaysian government achieved significant economic transformation within a short time. President Jacob Zuma was introduced to the approach during his State Visit to Malaysia in 2013, after which it was adapted to the South African context with the support of the Malaysian government and renamed Operation Phakisa.
[7] The Beneficiation Action Plan was due to be published in 2014. However, it has been subsumed into the Mining Phakisa and the IPAP.

FIGURE 1: THE NATIONAL BENEFICIATION STRATEGY IMPLEMENTATION FRAMEWORK (DMR, 2011)



The Beneficiation Strategy identifies ten commodities, clustered into five value chains, which are believed to possess the best prospects for beneficiation (DMR, 2011):

- Energy commodities (coal, uranium and thorium)
- Iron and steel (iron ore, chromium and manganese)
- Pigment and titanium production (titanium and vanadium)
- Autocatalytic converters and diesel particulate filters (platinum)
- Jewellery fabrication (diamonds, gold and platinum)

The Industrial Policy Action Plan (IPAP) (the dti, 2014) also has strong implications for beneficiation. It provides specificity in terms of detailed actions to address constraints. These are similar to the constraints identified in the Beneficiation Strategy, with certain additions, such as the lack of infrastructure linking mining locations with manufacturing centres, and low levels of effective competition in sectors dominated by a few entrenched firms. The latter concerns important inputs into downstream, labour-intensive manufacturing activities, such as carbon and stainless steel, aluminium and fertilisers. The IPAP proposes a range of measures and levers, such as financial and regulatory incentives, innovation and skills development support, and developmental trade policies (including export tariffs). The IPAP further identifies particular sectors (in three clusters) for targeting and

support[8]. These prioritised industries and products all have relevance to KwaZulu-Natal and present an opportunity for beneficiation in the province that could find national support for specific value chains.

Further to the National Beneficiation Strategy and the IPAP, there is a broad range of further strategies, policies, regulations and initiatives with limited direct and immediate bearing on minerals beneficiation in KwaZulu-Natal. All confirm the policy and strategy intent of government to support investment in minerals beneficiation to increase value addition, industrialisation and job creation. The National Development Plan and New Growth path both reference the potential for beneficiation, albeit with slightly different levels of focus, whilst the Special Economic Zones Act (2015) explicitly targets the beneficiation of mineral and natural resources (the dti, 2013b). Of particular relevance to KwaZulu-Natal is the provision that a provincial government may apply for a specified area to be designated as a Special Economic Zone (SEZ), as well as design its own support measures and incentive schemes to support the SEZ (the dti, 2013b).

There are also a number of policies and strategies at a provincial level that have bearing on mineral beneficiation in KwaZulu-Natal (see Figure 2). The Provincial Growth and Development Strategy (PDGS) and the related Provincial Growth and Development Plan (PGDP), which aims to implement the strategy, specifically identify the utilisation and beneficiation of mineral resources as one of the interventions to enhance development of the primary sector. This is as part of the strategic objective “Enhancing sectorial development through trade and investment” (KZN PPC, 2013). The metals and automotive sectors are identified by the PDGS as key sectors to focus on to enhance industrial development (KZN PPC, 2011b). The KwaZulu-Natal Industrial Development Strategy and the Export Strategy both identify minerals beneficiation and mineral products as well as the manufacturing sector, particularly automotive, machinery and equipment, as key sectors for economic growth (EDTEA, 2011). There are also several other provincial strategies and policies whose outcomes will have bearing on minerals beneficiation in KwaZulu-Natal, even though they do not deal directly with minerals beneficiation. These include the KZN Investment Promotion Strategy, Provincial Spatial Economic Development Strategy (PSEDS) and the Maritime Strategy. Central to these strategies is the development of Industrial Economic Hubs, with a hub in each provincial district, and Special Economic Zones in critical areas such as the Richards Bay Industrial Development Zone, together with growth of activities involved in beneficiation or value-adding (EDTEA, 2013, EDTEA, 2015).

[8] Cluster 1 includes sectors such as metals fabrication and its sub-sectors, basic metal and steel, basic non-ferrous metals & metal products, machinery & equipment, other transport equipment and electrical machinery. In Cluster 2, the automotive products and components sector is of particular interest. Cluster 3 comprises sectors such as advanced materials (including titanium), and the aerospace and defence industries.

FIGURE 2: MINERALS BENEFICATION POLICY LANDSCAPE IN KWAZULU-NATAL (STRATEGIES AND POLICIES IN BOLD SPECIFICALLY MENTION MINERALS BENEFICIATION)

The SIMS document mentioned previously is worth noting for its considerable bearing on the mining sector in South Africa (ANC, 2012). While it remains an ANC strategy, and not government policy, it could have an impact on future mining policies, although the extent is unknown. Its objective is to "maximise the development impact of minerals through labour absorbing growth and development, inter alia, to: capture the resource rents and invest in long-term knowledge and physical infrastructure; and industrialise, diversify and create more jobs through maximising the mineral linkages (backward, forward and knowledge)" (ANC, 2012).

One of the key proposals in the SIMS document relates to setting up a State Minerals Company (SMC) and a range of recommendations are made around how this should be structured, capitalised, and governed. It is proposed that the SMC develops "strategic minerals" to ensure that they are provided into the domestic market at competitive prices, with a particular emphasis on steel (and also a further recommendation to urgently introduce alternative steel producers to facilitate price competition). Such competitive pricing could have a significant impact on beneficiation competitiveness. In order to overcome a lack of coordination amongst national government departments, the SIMS document also proposes the merger of the Ministries of Trade and Industry, of Mineral Resources, of Energy, of Public Enterprises, of Economic Development and of Science and Technology. Failing this, a number of other proposals are made regarding improved coordination. A further proposal is to revise the Minerals and Petroleum Resources Development Act to maximise development impacts, including through beneficiation (ANC, 2012).

Of particular relevance to the KwaZulu-Natal minerals beneficiation strategy, and as mentioned in the analysis of international examples in Section 1.4.4 above, are proposed minerals beneficiation hubs aimed at substantial job creation (ANC, 2012). The hubs also have a technology focus through collaboration with Universities, Colleges, research institutions and industry. The SIMS further proposes that pilot beneficiation hubs could be financed from

the Minerals Development Fund, which is one of the three windows for receipts from a proposed Resource Rent Tax. As with other documents referred to here, the SIMS document concurs that the key constraint to the mining sector is human resource development, with a need to develop competent technical skills (ANC, 2012).

The detailed and fairly elaborate set of proposals together with the magnitude of reforms and complicated institutional architecture proposed in SIMS, even if translated directly into government policy, makes short term implementation unlikely. The Province will need to move ahead with its plans around minerals beneficiation without many of the proposed institutional, financial and other levers in place at a national level, although they may present future opportunities.

In supporting industry to beneficiate, co-operation between industry, government, labour and communities will be essential to realising broad development impacts in host communities, and is a pre-requisite for triple bottom line sustainability. The importance of effective and inclusive stakeholder engagement in the formulation of government strategies and policies was highlighted in a case study on the South African iron and steel scrap industry (Chitaka, 2015), with industry stakeholders believing that existing policies were not well suited to address the current decline in the industry sector. Although implemented with a view to ensuring a steady supply of reasonably priced, good quality scrap metal to local industries in the hopes of increasing capacity and competitiveness (the dti, 2013a), the study by Chitaka (2015) showed that the directive failed to address the challenges facing local scrap processors, whose main concerns centred around quality issues. The study also found that, whilst stakeholder engagement is considered to be essential to promoting effective policies and strategies, it is also important to present stakeholders with a wide range of sustainability issues during the consultation process in order to “force them to engage with issues that may not have come to mind intuitively” (Chitaka, 2015).

Beyond policy statements, strategies and regulations, achievement of a sustainable beneficiation industry that supports socio-economic development requires industry itself to be proactive in providing development opportunities for communities in the areas in which they operate. There is a body of literature that indicates best practice in mining, but little research appears to be have been targeted at manufacturing industries involved in downstream beneficiation. Much in line with the National Treasury recommendations for mining at the national level, a jointly developed framework in KwaZulu-Natal for realising development impact from minerals beneficiation in the province could assist all parties to tailor their actions accordingly.

2. STRATEGY PRINCIPLES AND INTERVENTIONS

With the context in which the strategy is to be developed having been described, this section presents the vision underpinning the strategy, the mission, goals and objectives and the key pillars supporting the strategy. It is important, however, to view strategy as a shared understanding of possible action built on detailed contextual analysis, rather than a fixed master plan to be carried out regardless of contextual changes.

2.1 Vision

A KZN province that derives economic benefit and job creation from the development of mineral value chains in an environmentally and socially responsible way.

2.2 Mission

To achieve this vision, it will be the mission of the provincial government of KwaZulu-Natal, in collaboration with its social partners, to ensure that mineral beneficiation is well-integrated with the provincial economy and provincial developmental goals, specifically to:

- Improve coordination and integration along value chains.
- Foster best environmental and industrial practice including technology and innovation.
- Support competitiveness of local businesses along mineral beneficiation value chains.
- Realise developmental impacts in communities hosting the beneficiation industry.
- Ensure that appropriate institutional architecture and programmes are put in place and supported to realise education and human resource development for the beneficiation industries.

2.3 Goals

The following outcome-oriented goals for the strategy are identified:

1. A conducive business environment (pricing, regulatory and markets) for mineral value chains.
2. Competitive and eco-efficient beneficiation processes and products in KwaZulu-Natal.
3. Adequate infrastructure and bulk services to support growth of the mineral value chains (electricity, gas, water, rail, ports, waste).
4. An increased and sustained skills base for minerals beneficiation in KwaZulu-Natal.
5. Maximum development impacts in local communities from beneficiation activities.
6. Increased participation of historically disadvantaged individuals along mineral beneficiation value chains.

2.4 Objectives

For each of the strategic outcome-oriented goals listed above, a goal statement and set of objectives have been identified:

1. Create a conducive business environment for mineral value chains	1.1 Exploit industrial support measures in attracting and retaining mineral beneficiators and associated industry 1.2 Investigate pricing mechanisms and incentives that can be utilised to ensure availability of supply at competitive prices in priority minerals value chains 1.3 Ensure that provisions for preferential local procurement are fully utilised to create markets for minerals beneficiated in KZN 1.4 Streamline regulatory compliance
2. Improve competitiveness and eco-efficiency of beneficiation processes and products in KZN	2.1 Improve coordination along the prioritised value chains 2.2 Improve partnerships and synergies between the prioritised value chains and other local industries 2.3 Invest in research and innovation across commodities, processes and functions 2.4 Support the uptake of the latest technologies 2.5 Advance resource efficiency
3. Provide adequate infrastructure and bulk services to support growth of the mineral value chains	3.1 Address availability and reliability of, and access to, infrastructure and services 3.2 Reign in rising costs of water and electricity
4. Increase and sustain the skills base in minerals beneficiation in KZN	4.1 Increase the number of skilled artisans 4.2 Ensure training of professionals suited to industry needs 4.3 Facilitate retention of highly skilled professionals
5. Maximise development impacts in local communities from beneficiation activities	5.1 Develop and implement a stakeholder compact 5.2 Work with companies, communities and local government stakeholders to create opportunities for shared value
6. Increase the participation of previously disadvantaged individuals along mineral beneficiation value chains	6.1 Train small business owners 6.2 Procure locally wherever possible 6.3 Ensure access to finance and markets for increased participation of black economic enterprises along the value chains

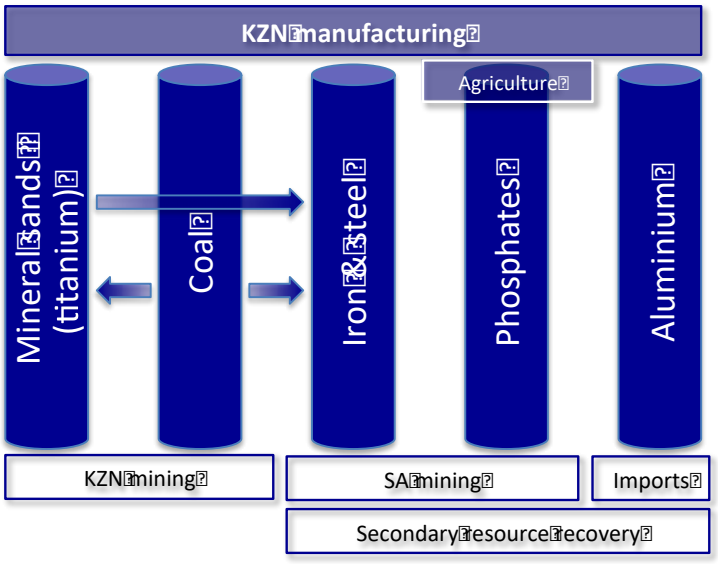
2.5 Strategic Commodities

This beneficiation strategy has been developed based on the analysis of five mineral commodities, thought, for various different reasons, to be the most relevant to advancing minerals beneficiation in KwaZulu-Natal. These are aluminium, iron and steel, mineral sands, phosphate and coal. In the following paragraphs, each of these pillars are discussed in relation to the above goals and objectives, whilst in Section 3.3 specific actions are unpacked to address the objectives identified across the five pillars.

Figure 3 provides a schematic of the five commodities on which the Strategy is based. The schematic shows that the intention of the commoditities, and the Minerals Beneficiation Strategy more broadly, is to support manufacturing in KwaZulu-Natal (with the exception of the phosphate pillar, that also supports agriculture). The schematic also shows that the pillars do not necessarily leverage mining opportunities in KwaZulu-Natal. The aluminium pillar rests on imported bauxite, whilst iron & steel and phosphates are contingent on resource bases outside of KwaZulu-Natal. It is only mineral sands and coal that reside fully within KwaZulu-Natal, although the potential to leverage primary iron & steel, aluminium and phosphates through secondary resource recovery within KwaZulu-Natal is an important aspect of the Strategy.

It should also be kept in mind that the commodities do not stand completely independently from each other, and there are many inter-linkages between them, particularly between coal, mineral sands and iron & steel (shown by the arrows in the schematic). There are also a number of synergies between the pillars. For example: increasing the number of artisans with metal working skills in the Province will potentially benefit manufacturing in aluminium and titanium (mineral sands), as much as it will iron & steel; foundries often process both aluminium and iron & steel, so supporting foundries or increasing scrap metal recovery will benefit both the aluminium and iron & steel pillars.

FIGURE 3: PILLARS OF THE MINERALS BENEFICIATION STRATEGY



2.5.1 Aluminium

South Africa does not have any known economic deposits of bauxite (alumina ore), but a substantial aluminium industry developed around the output of the Hillside and Bayside primary smelters, formerly owned by BHP Billiton. These smelters are both located in Richards Bay, and thus a significant portion of South Africa's downstream aluminium industry is established in KwaZulu-Natal. Bayside ceased smelting operations in 2014 and the Bayside Casthouse was sold to Isizinda Aluminium in June 2015. Hillside was acquired by South32 in May 2015. Hillside reduces alumina imported from Australia to aluminium metal. The aluminium is produced as remelt ingot, more than two thirds of which is exported. The Bayside Casthouse receives hot metal from Hillside, and produces rolling slab for the semi-fabricator Hulamin (located in Pietermaritzburg).

The South Africa value chain includes primary and secondary production (smelting), semi-fabrication (extrusion and foundry products) and fabrication (finished products). Table 2 summarises production and employment figures for the aluminium industry in South Africa. KwaZulu-Natal has a high share of the top-end of the value chain, with all the smelting capacity and a large portion of the semi-fabrication industry. The foundry and fabrication industry is largely located in Gauteng and the Eastern Cape, with a relatively small share in KwaZulu-Natal. Much of the downstream aluminium industry in KwaZulu-Natal developed around the output of the Bayside smelter because of the value-added products, such as rolling slab, extrusion billet and redraw rod, that were produced in the Bayside Casthouse. The partial closure of the Bayside Casthouse contributed substantially to the production capacity of the South African aluminium industry falling by more than 60% over the last seven years. Although not suitable for applications requiring high purity, recycling of scrap aluminium is an important part of the aluminium value chain. Secondary aluminium utilises 95% less energy than primary production and there are large numbers of jobs associated with the collection and sorting of the scrap metal. The availability of scrap of sufficient quality is a significant constraint on the viability of secondary producers and foundries in South Africa.

Only around 12% of primary aluminium produced in South Africa is retained in the domestic market after further processing. This can be seen in the high level of imports of unwrought *alloyed* aluminium into South Africa and high exports of unwrought *unalloyed* aluminium. Even where beneficiation is occurring, the bulk of products are exported at semi-fabrication level rather than as fabricated products (i.e. as aluminium sheets rather than car body parts). Despite this, the markets for fabricated aluminium products in South Africa are strong and diverse. This includes markets in construction (windows and doors, wall cladding and roofing), the electricity sector (transmission and distribution lines, renewable energy technologies) and the transport sector (trucks, buses, trains, aircraft and passenger cars), where aluminium is competitive with steel because of its lower weight and superior corrosion resistance, despite its higher price. Another market with strong growth potential is packaging, with the recent shift from steel beverage cans to aluminium cans. The background research to the development of this strategy focussed particularly on the potential for aluminium in the automotive industry. The demand for aluminium in body panels alone has the potential to double South Africa's current output of fabricated aluminium products (following projections in numbers of light vehicles produced in South Africa by the Automotive Production Development Programme (APDP)). However substantial capital investment and skills development will be required, particularly at the fabricator level, for South Africa (and KwaZulu-Natal in particular) to be able to capitalise on the opportunities for aluminium in the automotive value chain.

Past industry performance and future potential indicates that significant economic and welfare gains can be realised through increased downstream beneficiation and production of aluminium end use products. This is contingent on a **conducive business environment** that includes ensuring availability and fair pricing of feedstock, as well as appropriate use of local content regulations. **Value chain coordination** is required to ensure competitiveness and avoid import leakages. In terms of infrastructure, the provision of **bulk gas** from East Africa would be a game changer for aluminium smelting in KwaZulu-Natal, providing a lower-carbon, cheaper and more reliable energy source. Long-term survival of this very energy intensive sector will be contingent on access to competitively priced **low carbon electricity**. The current shortage of skills in the metal and automotive sector is a particular limitation to capitalising on the potential of aluminium in production of automotive body parts. Addressing this will require **investments into technology and training**. Benefits to local communities and entry of black industrialists can be maximized through the established **metals hub** in the RBIDZ, particularly integrated casting and metalworking facilities.

TABLE 2: OVERVIEW OF THE SOUTH AFRICAN ALUMINIUM INDUSTRY

Primary Aluminium		Tonnes / year[1]	Employment	Source
Primary aluminium production (KZN only)		719,000	3,000	(BHP Billiton, 2013a; BHP Billiton, 2013b)
Primary aluminium exports		600,000	-	(AFSA, 2013)
Secondary Aluminium				
Secondary aluminium production	– in SA – in KZN	25,000 Small	9,100 -	(AFSA, 2013; TIPS, 2013)
Secondary aluminium exports		3,000	-	(AFSA, 2013)
Unprocessed scrap exported		40,000	-	(AFSA, 2013)
Semi-fabricators				
Semi-fabricated products	– in SA	300,000	-	(AFSA, 2013)

	– in KZN	215,000	2,100	(Hulamin, 2013)
Semi-fabricated products exports		160,000	-	(AFSA, 2013)
Extruded product imports		15,000	-	(Personal communication, AFSA)
Foundries				
Cast products	– in SA – in KZN	25,000 Small (PE and Gauteng 88% of market)	1700	(TIPS, 2013)
Fabricators				
Fabricated products	– in SA – in KZN	~ 150,00 No estimate available	No estimate available	(TIPS, 2013)

[1] All figures are for 2012. Production figures lower down the value chain (i.e. for semi-fabricators, foundries and fabricators) are approximate as these are based on production assets rather than actual production in a particular year. Similarly employment figures should only be taken as indicative.

2.5.2 Iron and steel

South Africa has a well-established iron and steel sector, which has developed on the basis of large domestic reserves of iron ore. An overview of iron ore and steel industry in South Africa is presented in Table 3. The primary economically viable iron ore deposits in South Africa are in the Northern Cape, with lower grade resources found in Limpopo Province. Despite the existence of smaller, scattered iron ore deposits in KwaZulu-Natal, there are no iron ore mines currently operating in the province.

In primary steel making, iron ore and/or steel scrap is converted into crude steel. Carbon steel accounts for around 93% of the sector's output, with stainless steel making up the balance. ArcelorMittal has a very dominant position in South Africa, with a relatively small number of companies manufacturing primary carbon steel in South Africa. ArcelorMittal's Newcastle works, the only steel mill in KwaZulu-Natal, accounted for 22% of South Africa's primary steel production in 2012. However two projects are in the pipeline that could see KwaZulu-Natal account for a higher share of national production: The South African subsidiary of the Indian conglomerate Jindal Steel and Power Limited (JSPL) is exploring the feasibility of an iron ore mine and processing plant in KwaZulu-Natal, and a partnership between the Chinese steelmaking company Hebei Iron and Steel Group Co. and the IDC plan for a 5 million tonne steelmaking facility in South Africa, with the RBIDZ a strong contender for the location of the plant. However, with the current substantial over-supply in the global steel industry and with a number of South Africa's steel plants shutting down or facing closure, the future of these projects is uncertain.

High purity pig-iron with a low manganese content is also produced in KwaZulu-Natal as a by-product of ilmenite smelting, which is part of the operations of mineral sands companies Tronox and Richards Bay Minerals. The molten iron is tapped from the furnace, alloyed and then cast into ingots or "pigs". RBM produces about 80% of the total high-purity pig iron in South Africa, making up approximately 25% of global output.

The majority of primary steel produced in South Africa is processed into semi-finished products, with around 70% sold on the local market. The construction industry accounts for the greatest share of semi-finished products (23% in 2009). Semi-finished products are also converted into a very wide range of end use products by fabricators, including steel containers (beverage cans, drums etc.), panels for the automotive sector, roofing products, fencing, hardware products and pipes. Markets within Africa make up the greatest share of exported fabricated products, accounting for 64% of export value. In foundries, a wide range of products is made through

melting metal ingot and/or scrap metal and injecting into moulds under low pressure. Cast metal products find application in various sectors, with major end-use markets in South Africa including automotive, general engineering and mining. In 2011, 13% of South Africa's foundries were located in KwaZulu-Natal. Recycling end-of-life material is an integral part of the iron and steel value chain owing to its requirement as an input to primary steel making (EAF) and foundries. In KwaZulu-Natal there are 14 scrap metal recycling businesses that are members of the Metal Recyclers Association of South Africa (MRA).

Specific value chain opportunities that related to increased beneficiation in KwaZulu-Natal were identified in stakeholder interviews undertaken as part of the background research to the development of the Mineral Beneficiation Strategy. These included the manufacture of capital equipment for the mining sector and other applications that require heavy material handling; manufacture of grinding media, also for the mining sector (for which feedstock is available at the Newcastle plant); construction using light frame steel products; and preforming, cutting, punching and galvanising of products for a wide variety of applications. As many of the current fabricators and foundries in KwaZulu-Natal are operating under capacity, consideration should first be given to supporting these SMMEs before targeting expansion.

The crisis in the South African steel industry is in part attributable to an unfavourable business environment relating to pricing and non-enforcement of local content requirements. Provincial government has a role to play in addressing these aspects of creating a **conducive business environment**, which is critical to ensuring the sustainability of the industry. Since competitiveness, in this sector is linked to economies of scale, which are unlikely to be obtained, better opportunities in this value chain might be found in **niche and specialised products**, such as mining equipment, light steel construction, towers etc. **Reliable and competitively priced electricity**, linked to more diverse and resilient electricity supply infrastructure, will help sustain the industry. As with aluminium, the current shortage of skills in the metal working sector is a particular limitation to increased downstream fabrication. Addressing this will require **investments into technology and training**. Environmental impacts can be reduced through adopting best available technology, and this is inter-linked with **increased retention of scrap** in the South African market. The industry has a wide range of **opportunities for SMME development** in downstream manufacturing, preparing and forming which requires support by both government and industry to realise the full potential.

TABLE 3: OVERVIEW OF THE IRON AND STEEL INDUSTRY IN SOUTH AFRICA

Iron ore		Tonnes / year	Employment[1]	Source
Iron ore production (2012)	– in SA – in KZN	67,100,000 0	18,500	(DMR, 2012)
Iron ore exports (2012)		57,110,000		(DMR, 2012)
Primary steel products (ingots & continually cast products)				
Crude steel production (2012) (99.5% billets, blooms & slabs; 0.05% ingots) ArcelorMittal Newcastle Works, production capacity	– in SA – in KZN	6,938,500 1,600,000	17,000 1,600	(SAISI, 2013a) (ArcelorMittal, undated)
Imports of primary products (2012) (79% billets, blooms & slabs; 21% ingots)		9,906		(SAISI, 2013b)
Exports of primary products (2012) (98% billets, blooms & slabs; 2% ingots)		111,156		(SAISI, 2013d)

Pig iron (co-product of titania slag production)				
High-purity pig iron production (2012)	– in SA – in KZN	556,316 498,316	See Table 4	(DERA, 2014)
Foundry products				
Cast ferrous products (2011)	– in SA – in KZN	479,950 no data	24,400[2]	(El Mohamadi, 2012)

[1]Employment numbers are estimated from individual company reports (Anglo American, 2012; Kumba, 2013; Evraz, 2013; ArcelorMittal, 2012)
[2]Figure is for all metals and includes direct employees and admin & management staff. Production of ferrous products accounts for 84% of total foundry production in SA (El Mohamadi, 2012).

2.5.3 Mineral sands

KwaZulu-Natal has extensive 'heavy mineral sands' deposits, bearing ilmenite ($FeO.TiO_2$), rutile (TiO_2) and zircon ($ZrSiO_4$), with partial beneficiation already well established in Richards Bay. Exploitation and beneficiation of this resource is of strategic significance, as South Africa is the world's largest producer of titanium mineral concentrates (ilmenite and rutile), holding the fourth largest reserves, and the second largest producer of zirconium minerals, with the second largest reserves. An overview of the mineral sands sector in South Africa is presented in Table 4.

Two multi-national companies are involved in mineral sands mining in South Africa, Richards Bay Minerals (RBM) and Tronox, the latter with operations in KwaZulu-Natal (KZN Sands) and the Western Cape (Namakwa Sands). Both companies do not sell raw heavy mineral concentrates (HMCs) (the valuable components of mineral sands) but process them to produce various grades of rutile and zircon, as well as ilmenite. The latter requires smelting to increase its titanium dioxide content. The resulting titania slag, that along with rutile, is termed "titanium feedstock", is used in the manufacture of various titanium mineral and metal products. KZN Sands and Namakwa Sands treat only a portion of their ilmenite streams, whilst titania slag is RBM's primary product. High-purity low-manganese pig iron, as well as a carbon monoxide rich offgas, are produced as by-products of the smelting process.

The mineral sands sector in South Africa is focussed on upstream beneficiation, with relatively few downstream activities. The bulk of South Africa's **zircon** production is destined for the export market, with a few companies producing zirconium chemicals and ceramics. In KwaZulu-Natal, Thukela Refractories Isithebe produces 30,000 tonnes of fused alumina refractories per year and Dakot Milling Media produce zirconia-toughened alumina grinding media for use in mining and minerals processing. Growth in demand for refractories is currently weak as it is linked to the industries in which they are used, primarily iron and steel.

The production of **titanium dioxide pigments** is the primary use for titanium dioxide feedstocks. Huntsman Tioxide, located in Umbogintwini, is the only pigment producer in South Affrica. It uses the older sulphate process to produce around 25,000 tonnes TiO_2 pigment per year. A new plant producing pigment from a TiO_2 rich waste slag generated by Evraz Highveld Steel and Vanadium is planned by Nyanza Light Metals to be located at RBIDZ. Opportunities for increased domestic production of pigments is fairly limited, as South African plants will struggle to be competitive with the vertically integrated company Tronox, with pigment production facilities in Australia, the Netherlands and the USA, as well as large Chinese plants using the preferred chloride process.

There are no **titanium metal** producers or producers of **titanium tetrachloride** ($TiCl_4$) in South Africa, the most widely used feedstock for producing titanium metal. In 2007, the Department of Science and Technology (DST) initiated a programme to support the establishment of a titanium metal industry in South Africa. The first step has been the development of a novel process for titanium metal production, which involves the reduction of $TiCl_4$ to produce titanium powder. This process route is less energy intensive than the traditional production route and yields a superior product. A pilot plant for demonstrating the process was commissioned in March 2013, with the next phase being the construction of a semi-commercial test facility.

Despite being at a relatively early phase of its development, the production of titanium metal powder and the manufacturing of downstream products for the aerospace and defence industry are identified to hold high potential, as articulated in the latest Industrial Policy Action Plan. Economic predictions for titanium metal are high - even if titanium is only able to realise a fraction of its global potential, and South Africa can capture just 10% of near-term titanium metal demand, projections are for revenues upwards of $400 million per year (and $1,000 million a year if downstream industries are developed). Revenues are predicted to be up to 20 times higher should future market potential be realised, including displacement of high performance alloys and technologies currently in development, such as additive manufacturing (3D printing). Initial estimates of employment creation suggest that this is relatively modest, with around 1,000 jobs created for a single titanium metal powder facility, mill and first tier beneficiation (fabricated and cast products).

In the light of the significant mineral sands resources in KwaZulu-Natal and the competitive intent in other countries, the Province needs to pay attention to creating a **conducive business environment**, through the **full exploitation of SEZs**, as well as **streamlining of regulatory compliance** measures. Competitiveness in this value-chain is strongly linked to **innovation and next-generation opportunities,** particularly for titanium metal and for zirconium refractories, with clustering and value-chain coordination also of high importance in the near-term. The high energy requirements of beneficiation of these materials also requires a strong focus on **electricity supply infrastructure**, with functional and reliable infrastructure, especially as regards transportation, water and waste disposal, also a key enabler. In terms of human resources, both the ability to **attract and retain highly skilled graduates** to Richards Bay, and the **training and retention of artisans** able to work with these unique materials, will be key to growth of this pillar. Getting more value from by-products arising from processing of this resource, and from associated business development, as well as attention to compliance with environmental regulations along the value chain, are important to ensure that more economic value is created than damages left for society at large to pay for.

TABLE 4: OVERVIEW OF THE MINERAL SANDS INDUSTRY IN SOUTH AFRICA

Primary products		Tonnes / year	Employment[1]	Source
Titanium feedstock production in 2012 (Richards Bay Minerals and Tronox)	– in SA – in KZN	1,522,300 1,240,300	~ 4,500	(DERA, 2014)
Imports of titanium feedstock		112,760		(ITC, 2014)
Exports of titanium feedstock		917,140		(ITC, 2014)
Zircon feedstock production in 2012 (Richards Bay Minerals and Tronox)	– in SA – in KZN	326,670 272,670		(DERA, 2014)
Imports of zircon feedstock		330		(ITC, 2014)

Exports of zircon feedstock		223,280		(ITC, 2014)
Annual production capacities			**Employment**	
Titania slag	– in SA – in KZN	1,460,000 1,270,000	RBM: 2,147 permanent and fixed-term; Tronox KZN Sands: 750 permanent and 300 contractor	(Tronox, 2014c) (RBM, 2013b) (RBM, 2012) (BHP Billiton, 2012) (DERA, 2014)
Rutile	– in SA – in KZN	161,000 130,000		
Zircon	– in SA – in KZN	380,000 310,000		
Titanium pigments				
Pigment production in 2012 (KZN only) (Huntsman Tioxide (Pty) Ltd)		20,000		(DMR, 2013)
Imports of TiO_2 pigment products		14,620		(ITC, 2014)
Exports of TiO_2 pigment products		3,980		(ITC, 2014)
Titanium metal and articles thereof				
Production of titanium metal		0		-
Imports of titanium metal & articles thereof (2012)		604		(ITC, 2014)

[1]Assumes the new Fairbreeze mine will retain the jobs from the closed Hillendale mine (excludes construction jobs on the mine)

2.5.4 Phosphate

South Africa is the 15th largest producer of phosphate rock in the world, producing 2.3 million tonnes in 2013, and is one of only five countries that have significant phosphate rock reserves. South Africa's phosphate industry is dominated by one company, Foskor Limited, founded by the Industrial Development Corporation (IDC) in 1951 to provide a domestic source of phosphate fertilisers to support local agriculture. Foskor is a vertically integrated producer of phosphate ore, phosphoric acid and granular fertiliser. Phosphate rock is mined and processed in Phalaborwa, from which around 84% of the phosphate rock concentrate is railed to Richards Bay to produce phosphoric acid. The Richards Bay plant manufactures sulphuric acid, phosphoric acid and phosphate-based granular fertilisers (MAP and DAP). Table 5 provides an overview of phosphate industry in South Africa.

KwaZulu-Natal does not have primary phosphate resources, thus its strategic position is the infrastructure, industry know-how, and tax incentives that the Richards Bay IDZ offers. At least one company currently looking into phosphate mining in Limpopo plans for a phosphoric acid/fertiliser plant in Richards Bay. However, Foskor has a very dominant market position in South Africa, with all other companies formerly producing phosphoric acid and or phosphate fertilisers having ceased operations. Even though Foskor's technology is old and in need of replacement, its strategic value and IDC support mean that it is likely to continue to provide the base for South Africa's phosphate needs. Greater strategic benefit to KwaZulu-Natal can thus possibly be gained through exploring options for secondary phosphate production. In the long term secondary phosphates will start to account for an increasingly large share of phosphorous supply, as the demand for phosphorous increases and phosphate rock reserves are depleted. However, with South Africa's substantial phosphate reserves, resource constraints are unlikely to be a driver for secondary phosphate recovery in the medium to long term. Instead, the recovery of secondary phosphates will largely be driven by waste management concerns. Initiatives such as the rollout of urine diversion toilets (UDTs) present opportunities to produce secondary phosphates and/or fertilisers,

whilst simultaneously addressing critical sanitation needs in under-serviced communities. Such initiatives have the potential to reduce/prevent pollution of water bodies whilst providing a low-cost fertiliser product needed to sustain the livelihoods of the many subsistence farmers in KwaZulu-Natal.

A background research study to inform the development of the Minerals Beneficiation strategy surveyed various secondary phosphate sources in KwaZulu-Natal, and then analysed that with highest potential – struvite production from large, centralised sewerage-treatment plants and from decentralised UDTs. Struvite (magnesium ammonium phosphate) has potential as a slow-release fertiliser and is the most commonly employed method of recovering secondary phosphates from wastewater. Despite the relatively low revenue potential found by the analysis, there does seem to be a potential market for the struvite product. Even with South Africa's rich phosphate reserves and Foskor's world-scale production facilities, phosphates appear to be difficult to source domestically, with some small-scale fertiliser blenders resorting to imports. Testament to this is the fact that a pilot struvite production facility set up under the Valorisation of Urine Nutrients in Africa (VUNA) project has already been approached by a fertiliser blender in KwaZulu-Natal to purchase struvite from them (in larger amounts than they are currently able to supply). Nonetheless, struvite production is not without its challenges. Chief amongst this is the socio-economic acceptability of using fertilisers produced from human waste. A further barrier is the small production volumes relative to synthetic fertilisers, with large, established players able to undermine the market for struvite. Furthermore, the success of the source-separated urine value chain rests on building the social acceptability of UDTs, which was found to be low in a recent study on the eThekwini rollout of UDTs.

Although not able to be quantified, struvite production holds relatively high job-creation potential. This is consistent with many secondary material recovery systems, where high potential for employment exists in the collection and processing of the material. This is especially the case with the source-separated urine, where a decentralised model is proposed, and the technology to produce struvite is low cost and does not require skilled labour to operate. Further job-creation potential exists in the manufacture, installation and maintenance of UDTs, as well as further down the value chain in the blending and distribution of fertiliser products.

Foskor is one of the major contributors to KwaZulu-Natal's economy, not only in terms of the revenue from its Acid Division in Richards Bay and port usage, but also because its products are a key input to KwaZulu-Natal's strong agricultural sector, specifically also for a number of animal feed producers operating in the province. Reliable and affordable **infrastructure services**, particularly as regards rail, electricity and waste disposal, as well as **continued investment** into new technologies to remain competitive and limit environmental damage are key to maximizing value from the well-established beneficiation of primary phosphate. Growth opportunities with **significant social and environmental value addition** and opportunities for small and innovative business may, however, lie more in **resource recovery**, and these intersect strongly with the agricultural sector (especially in terms of manure management) and with sanitation infrastructure.

TABLE 5: OVERVIEW OF THE PHOSPHATE INDUSTRY IN SOUTH AFRICA

Phosphate rock	Tonnes / year	Employment	Source
Production of phosphate rock concentrate (2014) Limpopo Province	2,079,000		(Foskor Limited, 2014a)
Export of phosphate rock (2014)	188,384		(Foskor Limited, 2014a)
1st level beneficiated product: Phosphoric acid			
Production of phosphoric acid (2014) KwaZulu-Natal	510,000	640	(Foskor Limited, 2014a)
Imports of phosphoric acid (2014) (all grades)	6,768		(ITC, 2014)
Exports of phosphoric acid (2014) (all grades)	268,550		(ITC, 2014)
2nd level beneficiated products			
Production of phosphate fertilisers (2014) KwaZulu-Natal	307,000	Included in the above	(Foskor Limited, 2014a)
Imports of phosphate fertilisers (2014)	248,865		(ITC, 2014)
Exports of phosphate fertilisers (2014)	219,198		(ITC, 2014)
Imports of other phosphorous products (2014) (~ 60% sodium triphosphate & polyphosphates of metals)	22,635		(ITC, 2014)
Exports of other phosphorous products[2] (2014) (97% calcium phosphates)	281,678		(ITC, 2014)

2.5.5 Coal

Coal has historically played an important role in the industrialisation of KwaZulu-Natal, particularly with local metallurgical coal anchoring the Newcastle Steel works. Coal mining has, however, decreased as reserves have been depleted, with KwaZulu-Natal producing only some 1.3% of South Africa's coal output by 2013 (see Table 6). The province is, however, an important producer of anthracite (a low smoke high calorific value product), and its coalfields contain South Africa's only resources of high quality anthracitic coals.

Coal finds application in different areas according to its quality. By far the largest application is that of electricity generation, accounting for approximately half of South Africa's coal production. KwaZulu-Natal does not currently have any operating coal-fired power stations, although there are plans to establish a new anthracite coal mine and 1,050 MW coal-fired power station near the town of Colenso (Business Report, 2015). Background studies informing the development of this Strategy propose that opportunities in the metallurgical industry (coking coal), anthracite production and discard recovery warrant further exploration.

ArcelorMittal SA's Coke & Chemical Division is the only domestic producer of coke, using **coking coal** from Exxaro's Grootegeluk mine in Limpopo (currently the only major supplier of coking coal on the domestic market) and imports. There is thus potential for increased mining of coking coal to replace the portion that is currently met by imports at the Newcastle coke production facility. There is also potential to increase the coke production capacity, as metallurgical facilities in South Africa predominantly import their coke requirements. However, this is contingent on two important factors. The first is on a recovery of markets for ferroalloys and iron and steel, which are currently under severe pressure. The second is on the coking coal resources in KwaZulu-Natal being of

sufficient quality, as most metallurgical processes require coke of very specific properties. Further studies to obtain updated information on the quality as well as quantity of the remaining metallurgical coal resources in KwaZulu-Natal are thus needed in order to establish whether such opportunities exist.

There are clear synergies between **anthracite** and established minerals beneficiation operations in KwaZulu-Natal, with locally mined anthracite used in the processing of mineral sands mined in the Province. Over the last several years, calcined anthracite[9] has become a very competitive alternative to coke for the production of ferroalloys and is currently sold to the ferrochrome and iron and steel industry (Petmin, 2014). There is thus potential for calcined anthracite to replace a portion of the imported coke in metallurgical processes, particularly in ferroalloys. The potential for this is, however, strongly dependent on the particular properties of the anthracite. It is likely that partnerships will need to be forged between miners and/or calciners and the smelters, so that suitable reductant blend "recipes" can be developed for their smelting processes. Anthracite also has a number of niche applications; these include water filtration, urea manufacture, the production of plastics and industrial chemicals, and as an alternative to graphite. These markets are growing globally, and represent high value and potentially more robust markets for a coal product in an increasingly carbon-constrained world. However a detailed resource study to determine the volumes of anthracite available and the quality thereof (to determine suitability to supply different markets) is required.

A recent study on the economic potential of coal **discard** dumps in KwaZulu-Natal commissioned by EDTEA found that approximately 70% of the 84 identified discard dumps have potential for commercial exploitation (based on desktop research and site surveys). However, 85% of the dumps are in environmentally sensitive areas and their exploitation will require acceptable environmental management plans be put into place. The study recommends that a feasibility assessment be undertaken as a next step in the process, including a scoping study, pre-feasibility and full feasibility assessments to fully determine the value of reprocessing the discard dump(s). Essential to the feasibility study is a characterisation of the quality of the dump (surface sampling and drilling) and should prioritise those dumps identified with highest economic potential in the study. The feasibility study should also address the concerns identified in the coal discards study, such as the technical difficulty of working with material of marginal and potentially non-homogenous quality, the large residual waste portion that will require effective environmental management (on average only about 50% of the dump is useable), and the problem of building an industry on a finite resource (i.e. there will be no material to sustain the business once the dumps have been processed).

The coal sector is currently an extremely challenging one to be in, with a global trend of declining markets that looks set to continue. This is particularly true of thermal coal, and whilst coal is likely to remain a base-load electricity generating fuel for some time, current trends put increasing strain on marginal producers, with cost of production becoming increasingly important. This puts KwaZulu-Natal at a disadvantage, as the coal deposits are relatively difficult to mine, with only few favouring opencast methods, and economies of scale are largely lacking. The one advantage that KwaZulu-Natal does enjoy is proximity to ports and good rail and port infrastructure, although access for smaller players poses a challenge. Demand for metallurgical coal is likely to be more robust than that for thermal coal, as substitutability is less, but the overcapacity and falling demand for steel and ferroalloys has seen metallurgical coal demand also falling. Most of South Africa's steel plants are operating

[9] Calcining anthracite upgrades the quality allowing it to penetrate metallurgical markets Petmin (2014) 'Integrated Report 2014'. Available at: http://www.petmin-online.co.za/pdf/integrated-report/integrated-2014.pdf..

under capacity and/or facing closure, and as such, domestic markets for coke and calcined anthracite are under pressure. Nonetheless, smaller coal mining opportunities remain, particularly in anthracite mining and discard reprocessing, presenting opportunities for **black enterprise development** as the large mining houses have largely divested from the Province. The scale of the opportunity, particularly for value-add through beneficiation, does however remain small, and must be balanced with large risks of environmental damage and human health impacts.

TABLE 6: OVERVIEW OF THE COAL INDUSTRY IN SOUTH AFRICA AND KWAZULU-NATAL

Coal (all grades)		Tonnes / year[1]	Employment	Source
Saleable coal production	– in SA – in KZN	256,282,000 3,580,000	90,000 ~ 3,000	(CoM, 2014)
Total coal export sales		74,566,000		(CoM, 2014)
Total coal imports		1,964,000		(ITC, 2014)
Anthracite				
Anthracite production	– in SA, 2012 – in KZN, 2013	3,005,000 2,750,000		(UN, 2013)
Anthracite exports		656,000		(ITC, 2014)
Anthracite imports		106,000		(ITC, 2014)
Coke				
ArcelorMittal SA		391,000		(ArcelorMittal, 2014)
Imports of coke		253,000		(ITC, 2014)
Exports of coke		23,000		(ITC, 2014)

[1] All figures are for 2013, unless otherwise indicated. Production figures for KZN are approximate as they are based on the sum of individual collieries' production data.

3. IMPLEMENTATION FRAMEWORK

This section provides the institutional arrangements for the implementation of the strategy, an outline of the strategy roll-out process and the programmatic interventions per goal and objective – the actions that need to be taken to implement the Strategy.

3.1 Institutional arrangements

This minerals beneficiation strategy will be implemented through the KwaZulu-Natal Provincial government in conjunction with other spheres and vehicles of government (national and local government and special purpose vehicles), as well as government's social partners from industry and society, as illustrated in Figure 4. The overall coordination of the strategy is the responsibility of the KZN Department of Economic Development, Tourism and Environmental Affairs (EDTEA). Key actors include the Provincial Planning Commission (PPC) and the implementing agents set up in the Province, including special economic zones (RBIDZ and Dube Trade Port), and investment (TIKZN), funding (Ithala, KZN Growth Fund Trust), business development (Small Business Growth Enterprise) and training bodies (Moses Kotane). Industry partners include the state-owned enterprises, Eskom and Transnet National Ports Authority (TNPA) and businesses and industry associations active in the minerals sector. A list of industry partners for each of the mineral commodities forming the pillars of the strategy (aluminium, iron and steel, mineral sands, phosphate and coal) is given at the end of Section 3.3.

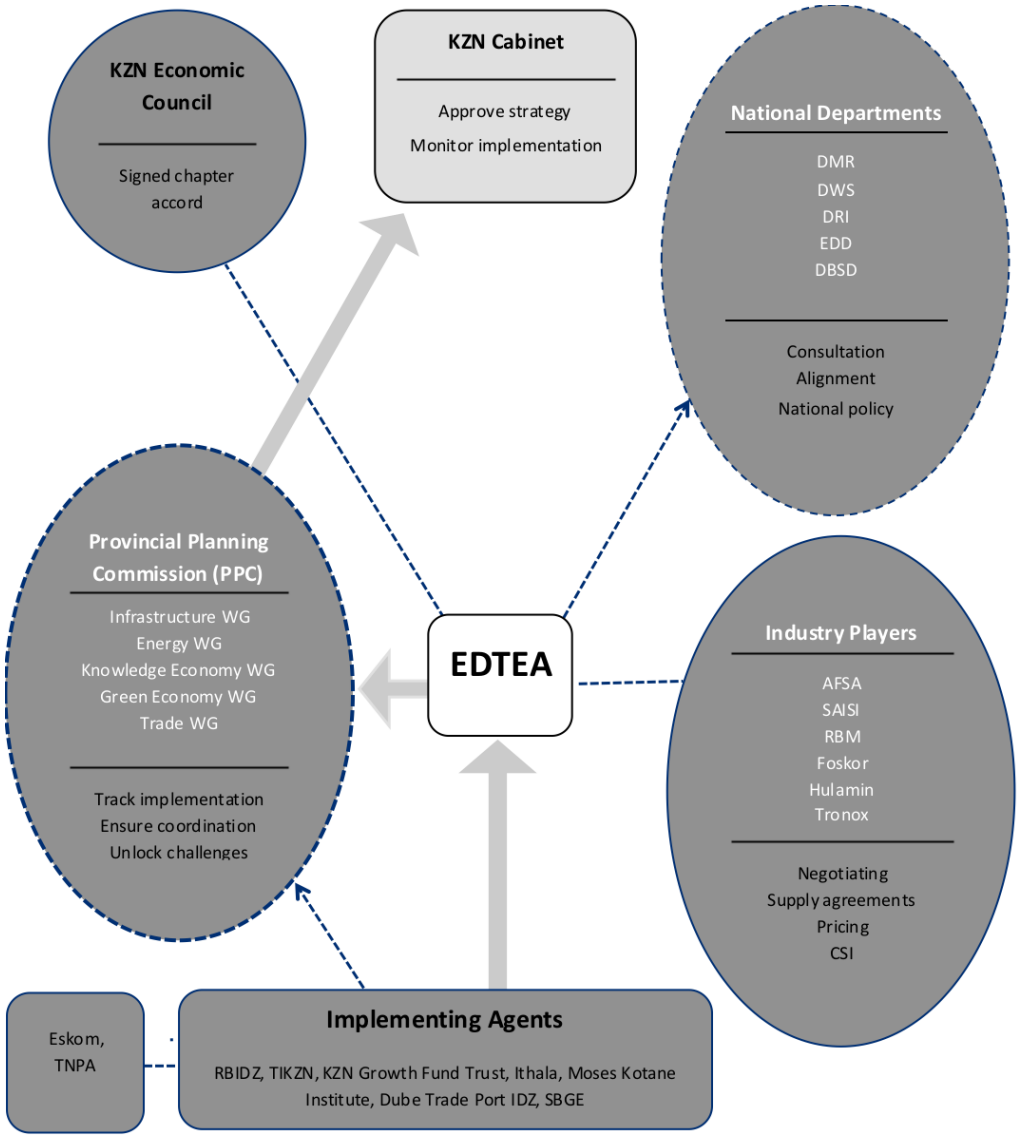
3.2 Strategy roll-out

The implementation of the strategy will take place over three phases:

- **Phase 1:** Dissemination, buy-in and capacity building
- **Phase 2:** Roll-out of the programmatic interventions
- **Phase 3:** Strategy review

Each of these is discussed in the sub-sections that follow. In addition, the implementation framework is underpinned by the roll-out of a monitoring and evaluation framework to track progress towards achieving the beneficiation strategy's aims.

FIGURE 4: INSTITUTIONAL ARRANGEMENTS FOR THE IMPLEMENTATION OF THE MINERALS BENEFICATION STRATEGY



3.2.1 Phase 1: Dissemination, buy-in and capacity building

The first phase of the implementation is that of dissemination of the strategy as widely as necessary and possible to inform strategic partners of its content and intention, and to obtain buy-in and commitment to realising its implementation. This phase will be achieved through a series of workshops and stakeholder meetings, with the specific programme of engagement to be determined by the Department of EDTEA. The strategy should also be

published through the Department's website to make it a public document which will support it obtaining wider reach and participation.

At the same time an individual should be appointed within EDTEA whose overall responsibility it is to oversee implementation of the strategy (this may not need to be a full time position). This person will need to be supported by at least six senior individuals either within EDTEA or in other government departments who will be responsible for coordinating implementation and monitoring of the objectives across the six strategic goals and five pillars. Once again these may not need to be full time positions, but can form a component of existing employees roles and responsibilities. The first phase of the strategy implementation will focus on identifying the number of individuals required (optimal grouping of goals, pillars and value-chains to best oversee the implementation of the strategy), identifying suitable candidates and departments to host them, and equipping them with the necessary skills and knowledge to step into these roles.

Responsibility: Driven by EDTEA with participation from strategic partners.

Timing: Suggested date for completion is within 6 months of Cabinet's acceptance of the strategy.

3.2.2 Phase 2: Roll-out of the programmatic interventions

This phase of the implementation represents the core of the strategy roll-out. The tables in Section 3.3 identify the actions required to implement the strategy, as well as roles and responsibilities of the implementing agents. Because of the relatively large number of interventions required, these are identified as being short term, medium term or long term to help prioritise the actions required.

Monitoring and evaluating progress according to the strategic goals is an essential component of the Strategy. A draft Monitoring and Evaluation framework is given in Annex 2. Finalising the M&E framework and identifying the individuals responsible for monitoring will be part of the initial responsibilities of the person appointed by EDTEA to drive the strategy.

3.2.3 Phase 3: Strategy review

In order to ensure that the strategy remains up to date and relevant, it should be reviewed after a period of five years. The update should take into account changing economic conditions and the progress made in the period after implementation of the strategy. The review will draw on the Monitoring and Evaluation programme established for the Strategy, which is to be conducted in tandem with the Implementation programme.

Responsibility: EDTEA strategy implementation lead, with external support if necessary. Strategic partners will be actively drawn upon to provide inputs to the update.

Timing: The process of updating the strategy is to start in the last quarter of 2020, so that the update is complete and ready to be implemented in the second quarter of 2021, which is when the period covered by this current strategy ends.

3.3 Programmatic interventions

The implementation plan is shown in the following six tables, with one or more programmatic interventions suggested for each of the strategic objectives which fall under the six goals. Each goal and its objectives are applicable to one or more of the pillars (mineral commodities), thus advances in any of the pillars will require several goals to be worked on synergistically. Certain of the strategic objectives are also synergistic, and advancing them will progress more than one goal.

In addition to the programmatic interventions, the Implementation Plan provides information on applicability to the pillars, timing and roles and responsibilities.

Notes to the Implementation Plan tables:

- The third column indicates which of the pillars (mineral commodities) the strategic objective is applicable to, with the commodity given in bold if the interventions required are especially relevant to that pillar;
- The fourth column indicates the suggested timing and prioritisation of the interventions, with Short = action required in <1 year, Medium = action required in the next 2-3 years, and Long = action required after 3 years;
- The final column lists the parties responsible for implementing the suggested activities. Industry partners are pillar-specific in some cases, and a non-exhaustive list is provided after the Programmatic Intervention tables (Table 7).

GOAL 1: CREATE A CONDUCIVE BUSINESS ENVIRONMENT FOR MINERAL VALUE CHAINS

Objective	Programmatic intervention	Applicable to:	Time frame	Implementing parties
1.1 Exploit industrial support measures in attracting and retaining mineral beneficiators and associated industry	• Establish a metals hub to support the manufacture of end use metal products; • Develop industrial support mechanisms to promote minerals beneficiation in KZN such as administered prices, capital financing opportunities and market opportunities; • Disseminate up-to-date targeted information relating to opportunities and incentives for mineral beneficiation to potential investors through publications, websites and information sessions; • Operationalise the auto supplier park in Durban and ensure it utilises locally manufactured aluminium and iron & steel products; • Develop, in partnership with the OEMs and component manufacturers, a strategy to expand the manufacture of components for passenger cars and medium & heavy commercial vehicles in KZN; • Designate SEZ status to identified mineral beneficiation industry clusters like aluminium to exploit the benefits accruing therefrom. **Iron & Steel** • Attract an iron & steel company to increase the supply of steel on the local market and stimulate the demand for complimentary products, such as coal. **Mineral sands** • Vigorously lobby for Richards Bay to host the pilot plant of the CSIR titanium powder production technology.	Aluminium Iron and steel Mineral sands	Short	EDTEA (and its agencies) to coordinate activities and take the lead on communication of opportunities; Consultation with aluminium, iron and steel and mineral sands industry partners; Co-ordination and consultation with national government, especially DTI, DST and SEZs to learn from their experiences; Consultation with research bodies, especially the TiCoC.
1.2 Investigate pricing mechanisms and incentives that can be utilised to ensure availability of supply at competitive prices in priority minerals value chains	• Negotiate pricing with business as part and parcel of industrial support measures; • Negotiate and secure supply of metals to downstream industry players at developmental prices; • Investigate the effect of dumping of metal products on local minerals beneficiators and review the associated tariffs accordingly.	Aluminium Iron and steel Phosphate	Short	EDTEA to communicate and engage on this issue with industry partners and national government (ITAC); Table at KZN economic council (chapter accord).

Objective	Programmatic intervention	Applicable to:	Time frame	Implementing parties
1.3 Ensure that provisions for preferential local procurement are fully utilised to create markets for minerals beneficiated in KZN	• Ensure that suppliers to the KwaZulu-Natal government comply with the requirements of the NIPP and invest in local economic activities within the province; • Skill municipalities in developing tenders to include local content requirements in line with the provisions of the Preferential Public Procurement Finance Act (PPPFA), and thereafter in assessing tenders on local content during the adjudication processes; • Ensure that government officials developing tenders, particularly those in the target sectors of the IPAP, are clear on the process of verification and the need for specifying upfront whether the government department or the supplier will pay for verification (e.g. that suppliers be provided with the opportunity to charge the cost of verification over and above the amount bid for a tender); • Work with and encourage companies operating in the province to increase their local procurement spend on products manufactured in the Province.	Aluminium Iron and steel	Short	EDTEA together with its partners across national, provincial and municipal government, including Treasury, DTI, COGTA; PGDP work-groups; industry partners and the State-Owned Enterprise Procurement Forum (SOEPF).
1.4 Streamline regulatory compliance	• Streamline EIA processes to ensure reasonable time to operations for mineral beneficiators; • Streamline water use licensing to ensure reasonable time to operations for mineral beneficiators; • Establish one-stop shop to provide regulatory assistance, coordinate and support the operations of mineral beneficiators in the province.	Aluminium Iron and steel Mineral sands Phosphate Coal	Medium	EDTEA to collaborate with partners at provincial and national government.

GOAL 2: IMPROVE COMPETITIVENESS AND ECO-EFFICIENCY OF BENEFICIATION PROCESSES AND PRODUCTS IN KZN

Objective	Programmatic intervention	Applicable to:	Time frame	Implementing parties

2.1 Improve coordination along the prioritised value chains	• Organise a forum for value chain members, preferably one that meets frequently (e.g. quarterly) and/or online platforms and communication materials. The fora and/or communication platforms should:
	  ○ Promote an understanding of each producers' role in the value chain and create a shared vision of value chain opportunities;
	  ○ Identify blockages and work towards unblocking these;
	  ○ Identify relevant hubs and clusters and promote these (where these already exist), or identify where these would be beneficial and work towards their creation with the relevant agencies (Objective 2.2).
		Aluminium
		Iron and steel
		Mineral sands
		Phosphate
		Coal
			Short	EDTEA and industry partners.

2.2 Improve partnerships and synergies between the prioritised value chains and other local industries	• Establish relevant mineral beneficiation and metal working clusters; • Support technology transfer initiatives to improve the operational efficiencies of mineral beneficiators; • Encourage local steel and ferroalloy manufacturers to form partnerships with local coal producers so as to investigate possibilities for locally mined coal to replace a portion of imported coke.	Aluminium Iron and steel Mineral sands Coal	Short	EDTEA, industry associations & industry partners, and tertiary instituions.
2.3 Invest in research and innovation across commodities, processes and functions	• Support the establishment of techno parks to promote industrialisation through commercialisation of research outputs; • Promote national government innovation programmes to stakeholders in the Province (e.g. through the monthly fora suggested in Objectives 2.1 and 2.2); • Investigate incentives for innovation so as to motivate companies to expand their R&D budgets allocated to province-specific innovation. **Mineral Sands (Titanium)** • Get involved in research towards the commercialisation of the CSIR titanium powder production technology, as well as in downstream application areas, such as 3D printing. **Phosphates** • Research technologies for the recovery of phosphates from human and animal wastes that translate to safe, socially and commercially viable secondary products. **Coal** • Conduct a detailed resource study on the availability and quality of the remaining coal resources in KZN; • Conduct a discard sampling study on the discard dumps prioritised for economic viability (building on the Discard Utilisation Study); • Research innovative niche markets for anthracite, especially with respect to its substitutability in metallurgical processes.	Aluminium Iron and steel **Mineral sands** **Phosphate** **Coal**	Medium	DST and national government innovation programmes, TIKZN and industry partners. TiCoC VUNA project CGS

2.4 Support the uptake of the latest technologies	• Develop mechanisms for sharing knowledge on latest technologies (e.g. through communication materials and monthly fora identified in Objectives 2.1 and 2.2); • Promote incentive structures for the uptake of new technologies (e.g. such as those around energy efficiency); • Work with industry and training colleges to ensure training programmes are up to date and relevant.	**Aluminium** Iron and steel Mineral sands Phosphate **Coal**	Long	EDTEA, industry partners and industry associations; forums and hubs; EDTEA and TIKZN.
2.5 Advance resource efficiency	• Establish and implement an industrial symbiosis programme in KZN; • Promote industrial ecology in planning of clusters, SEZs etc. *Actions under Objective 2.4 will also address this objective as new technologies typically advance material and energy efficiency*	Aluminium Iron and steel Mineral sands Phosphate Coal	Short	National Cleaner Production Centre (NCPC) and KZN Industrial Symbiosis Programme, industry partners, SEZs.

GOAL 3: PROVIDE ADEQUATE INFRASTRUCTURE AND BULK SERVICES TO SUPPORT GROWTH OF THE MINERAL VALUE CHAINS

Objective	Programmatic intervention	Applicable to:	Time frame	Implementing parties
3.1 Address availability and reliability of, as well as access to, infrastructure and services	**Ports** • Establish a container terminal at Richards Bay port to facilitate the exports of beneficiated products; • Support applications for port access from small coal miners wishing to export anthracite (e.g. though lobbying and facilitating negotiations). **Electricity and gas** • Establish a gas to power plant in Richards Bay to exploit the gas reserves in Mozambique; • Support alternative electricity generation sources in the Province, such as co-generation and own generation; • Attract alternative electricity generation to the Province by creating a conducive environment to Independent Power Producers (IPPs). **Water** • Investigate innovative water technologies to address water challenges, e.g. desalination, cascading water reuse/recycling and storm water harvesting; • Ensure water reticulation infrastructure is proactively maintained to reduce leakages and wastage. **Waste** • Ensure availability of appropriate special waste disposal facilities for by-products of minerals beneficiation; • Investigate value-adding water and waste treatment technologies, such as innovative technologies for producing fertiliser from human waste.	Aluminium Iron and steel Mineral sands Coal Aluminium Iron and steel Mineral sands Phosphate Coal Phosphate Coal	Long	National and provincial government departments working together with state-owned enterprises to achieve infrastructure role out, including Department of Energy, Department of Water and Sanitation; TNPA. SEZ's are a key actor, as they can set up infrastructure on their sites, as are local government. Private sector companies will also be required to build pipelines and gas-fired power stations and provide waste management services. Industry partners will also need to be active in negotiations around access to rail and port services.
3.2 Reign in rising costs of water and electricity	• Assist companies with negotiating favourable (fair, appropriate) electricity pricing models with municipal providers; • Assist companies with negotiating fair water access and pricing models with municipal providers; • The electricity and water actions identified in Objective 3.1 above will also lower costs, in addition to improving reliability and access.	Aluminium Iron and steel Mineral sands Phosphate Coal	Medium	TNPA is a key player in streamlining provision of bulk gas, while discussions surrounding fair and appropriate electricity pricing models with Eskom, DWS and municipalities will be facilitated by EDTEA.

GOAL 4: INCREASE AND SUSTAIN THE SKILLS BASE IN MINERALS BENEFICIATION IN KZN

Objective	Programmatic intervention	Applicable to:	Time frame	Implementing parties
4.1 Increase the number of skilled artisans	• Identify critical shortages in artisanal skills in the metal-working industries, and to work with the FETs, SETAs and industry training programmes to expand and customise training programmes to meet the skills shortfalls; • Develop highly focussed and targeted SMME training; • Leverage specialised technical and vocational training through national and international partnerships; • Develop mentorship programmes where experienced artisans help young artisans develop work and life skills; • Facilitate increased in-house training and internships for artisanal training.	Aluminium Iron and steel Mineral sands	Short	Collaboration required between EDTEA to coordinate actions; industry partners to identify their critical training needs and to provide internships and training; colleges, FETs, SETAs to provide appropriate training to meet industry's needs.
4.2 Ensure training of professionals suited to industry needs	• Work with industry, universities and training colleges in the Province to ensure courses are relevant to minerals and manufacturing industries' needs; • Institute bursary programmes to increase the number of graduate professionals and engineers; • Institute bursary programmes for postgraduate training where advanced research skills are required, e.g. mineral sands (titanium); • Work with industry, universities and training colleges to run open-days/information sessions so that prospective students know about the opportunities in minerals beneficiation.	Aluminium Iron and steel **Mineral sands**	Medium	Industry needs to identify its requirements in this regard, and work with tertiary education facilities to ensure that training meets their needs; The Department of Higher Education, as well as universities, should be engaged on the suitability of programmes and curricula for minerals beneficiation; DST, National Research Foundation (NRF) for providing funding for research and postgraduate training in tertiary education.
4.3 Facilitate retention of highly skilled professionals	• Provide recent graduates with information on opportunities in the Province (e.g. through open days with industry participation); • Design training and bursary programmes so that they include a commitment for recipients to work in the Province.	Aluminium Iron and steel **Mineral sands**	Medium	EDTEA working with industry partners, universities and tertiary education funding programmes (DST and NRF).

GOAL 5: MAXIMISE DEVELOPMENT IMPACTS IN LOCAL COMMUNITIES FROM BENEFICIATION ACTIVITIES

Objective	Programmatic intervention	Applicable to:	Time frame	Implementing parties
5.1 Develop and implement stakeholder compacts	• Audit and assess the effectiveness of stakeholder engagement processes (e.g. in SLPs, EIAs, EMPs etc.) for a selected number of sites; • Develop and road test a stakeholder compact on one site, with a view to establishing guidelines for best practice.	Aluminium Iron and steel **Mineral sands** Phosphate **Coal**	Medium	Regional office of DMR and EDTEA, working in conjunction with industry partners piloting this idea at identified sites.
5.2 Work with companies, communities and local government stakeholders to identify and create opportunities for shared value	• Work with industry to review and modernise enterprise development programmes, e.g. through workshops, so that companies are up to date on recent thinking on creating shared value (CSV) for communities and stakeholders; • Provide training opportunities for companies on CSV.	Aluminium Iron and steel Mineral sands Phosphate Coal	Medium	EDTEA, working in conjunction with industry partners.

GOAL 6: INCREASE THE PARTICIPATION OF PREVIOUSLY DISADVANTAGED INDIVIDUALS ALONG MINERAL BENEFICIATION VALUE CHAINS

Objective	Programmatic intervention	Applicable to:	Time frame	Implementing parties
6.1 Train small business owners	• Design and offer accessible and relevant training courses in both technical and business skills; • Develop mentorship programmes where experienced business owners and industrialists provide targeted guidance for participating beneficiaries.	Aluminium Iron and steel Mineral sands **Phosphate** **Coal**	Short	The Small Enterprise Development Agency working together with the relevant SETAs and local training colleges.
6.2 Procure locally where ever possible	• Work with industry to promote local procurement and address international businesses' procurement policies that exclude local providers (particularly relevant to OEMs); • Work with State Owned Enterprises to ensure local procurement takes place; • Support local service providers to communicate their service and product offerings to businesses operating in the Province; • Facilitate the registration of local businesses as suppliers on provincial and local government supplier databases. • Facilitate the identification of procurement and market opportunities for black owned enterprises and suppliers	Aluminium Iron and steel Mineral sands Phosphate Coal	Short	EDTEA, Office of the Premier, Small Enterprise Development Agency; State-Owned Enterprise Procurement Forum (SOEPF); TIKZN.
6.3 Ensure access to finance and markets for increased participation of black economic enterprises along the value chains	• Assist KZN black industrialists to tap into the national dti black industrialists programme; • Improve access by black industrialists to early stage capital and relevant non-financial support to develop projects bankability stage; • Assist black industrialists with market opportunities; • Train and build capacity in black entrepreneurs (as per Objective 6.1).	Aluminium Iron and steel Mineral sands Phosphate **Coal**	Short	EDTEA, Office of the Premier, Small Enterprise Development Agency; State-Owned Enterprise Procurement Forum (SOEPF), TIKZN.
6.4 Advance radical economic transformation	• Transform the ownership patterns along the mineral value chains • Facilitate the development of suppliers and enterprises along the mineral value chains • Ensure that employment and management control in the sector is reflective of provincial demographics	Aluminium Iron and steel Mineral sands Phosphate **Coal**	Short	EDTEA, Office of the Premier, Small Enterprise Development Agency; State-Owned Enterprise Procurement Forum (SOEPF), TIKZN, KZN Growth Fund

TABLE 7: INDUSTRY PARTNERS

	Aluminium	Iron and steel	Mineral sands	Phosphates	Coal
Industry associations	Aluminium Federation of South Africa	South African Iron and Steel Institute (SAISI) Southern African Institute of Steel Construction (SAISC) Association of Steel Tube & Pipe Manufacturers Steel and Engineering Industries Federation of Southern Africa (SEIFSA)		Fertilizer Association of Southern Africa (FertASA)	
Primary producers	South32 Hulamin Foundries, including Non-ferrous Metal Works (NFM)	Arcelor Mittal Newcastle Works Foundries, including Böhler Uddeholm Africa, PEFCO, Umgeni Iron Works	Richards Bay Minerals (RBM) Tronox KZN Sands	Foskor Limited	Petmin (Somkhele anthracite mine) Buffalo Coal Rio Tinto (Zululand Anthracite Colliery) Shanduka (Springlake Colliery) ArcelorMittal SA Coke and Chemicals
Manufacturers of end use products	Pro Aluminium and Glass	Packaging manufacturers, incl. Grief SA and Metcan Construction products, incl.	Huntsman Tioxide Thukela Refractories Isithebi (TRI)	Animal feed manufacturers, incl. Afgri Animal Feeds, Meadow Feeds and Voermol	Colenso Power Assmang Manganese Cato Ridge Works

	Safal Steel and Tugela Steel Automotive component manufacturers, incl. Pressure Die Castings, MAHLE Behr South Africa Automotive manufacturers, incl. Bell Equipment and Toyota SA	Dakot Milling Media (DMM)		
Initiatives, clusters etc.	Durban Automotive Cluster Automotive Supply Chain Competitiveness Initiative (ASCCI)	Titanium Centre of Competence (CSIR)	VUNA Project	

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ANNEX 1: EXECUTIVE SUMMARIES OF SUPPORTING STUDIES

ANNEX 2: MONITORING & EVALUATION FRAMEWORK

This Annex presents a framework, to be adapted to provide a monitoring and evaluation (M&E) plan for the implementation of this strategy. It is important that this M&E framework be adapted and the M&V plan be developed and owned by the entity entrusted with the task of monitoring and evaluating the implementation and impact of this strategy. Furthermore, implementing the M&E framework depends on data availability, which will only be fully understood once the strategy begins to be implemented on the ground. Finally, an M&E framework requires both baseline data and targets to be set. While some attempt is made to identify possible sources of baseline data and suggest such targets, these will also need to be developed in detail by the framework owners.

As such, it is recommended that one of the first tasks undertaken by the individuals appointed to drive the strategy as identified in Section 3.2.1 is to refine both the structure and the content of this framework (in terms of indicators and reporting schedules) to suit their needs.

With this context having been stated, the Annex presents the following components of the framework:

- A set of indicators for each of the objectives under each of the goals.
- Comments on establishing baselines and setting of targets for the indicators
- A note on reporting

Together this information provides a platform for *monitoring* the implementation of the strategy and *evaluating* the progress towards identifying where improvements need to be made. For clarity, the definitions of Monitoring and Evaluation as provided in the South African government's government-wide M&E system[10] are repeated here as follows:

- **Monitoring** is a continuous managerial function that aims to provide managers, decision-makers and main stakeholders with regular feedback and early indications of progress or lack thereof in the achievement of intended results and the attainment of goals and objectives. Monitoring involves reporting on actual performance against what was planned or expected according to pre-determined standards. Monitoring generally involves collecting and analysing data on implementation processes, strategies and results, and recommending corrective measures.
- **Evaluation** is a time-bound exercise that systematically and objectively assesses the relevance, performance, challenges and successes of programmes and projects. Evaluation can also address outcomes or other development issues. Evaluation usually seeks to answer specific questions to guide decision-makers or programme managers. Evaluation should advise whether underlying theories and assumptions were valid, what worked, what did not work, and why. Evaluation commonly aims to determine relevance, efficiency, effectiveness, impact and sustainability.

[10] http://www.samea.org.za/documents/Government_Wide_ME_System.pdf

Indicators

For each objective in each goal a set of indicators is identified. Each objective has more than one indicator, which is deemed appropriate given the number of programmatic interventions which fall under it. A distinction is made between *output* indicators, which represent a direct measure of the activities undertaken under the strategy, while *outcome* indicators represent longer term changes that come about as a result of the programmatic interventions having been undertaken. It was not, however, considered necessary to provide output and outcome indicators for each of the interventions as this would make the M&E framework overly cumbersome to implement.

In developing the indicators, the SMART principals for selecting indicators outlined in the GEF M&E guidelines and others were adhered to:[11]

- **Specific**: captures the core of the desired result by clearly and directly relating to the achievement of an objective and only that objective.
- **Measurable**: unambiguously specified so that all parties agree on what they cover and there are practical ways to measure them.
- **Achievable and Attributable**: identifies what changes are anticipated as a result of the intervention and whether the results are realistic. Attribution requires that changes in the targeted developmental issue can be linked to the intervention.
- **Relevant and Realistic**: establishes levels of performance that are likely to be achieved in a practical manner and that reflect the expectations of stakeholders.
- **Time-Bound, Timely, Trackable, and Targeted**: allows progress to be tracked in a cost-effective manner at the desired frequency for a set period, with clear identification of the particular stakeholder group(s) to be affected by the project or program.

[11] https://www.thegef.org/gef/Policies_and_Guidelines

GOAL 1: CREATE A CONDUCIVE BUSINESS ENVIRONMENT FOR MINERAL VALUE CHAINS

Objective	Programmatic intervention	Output indicators	Outcome indicators
1.1 Exploit industrial support measures in attracting and retaining mineral beneficiators and associated industry	• Establish a metals hub to support the manufacture of end use metal products; • Develop industrial support mechanisms to promote minerals beneficiation in KZN such as administered prices, capital financing opportunities and market opportunities; • Disseminate up-to-date targeted information relating to opportunities and incentives for mineral beneficiation to potential investors through publications, websites and information sessions; • Operationalise the auto supplier park in Durban and ensure it utilises locally manufactured aluminium and iron & steel products; • Develop, in partnership with the OEMs and component manufacturers, a strategy to expand the manufacture of components for passenger cars and medium & heavy commercial vehicles in KZN; • Designate SEZ status to identified mineral beneficiation industry clusters to exploit the benefits accruing therefrom. **Iron & Steel** • Attract an iron & steel company to increase the supply of steel on the local market and stimulate the demand for complimentary products, such as coal. **Mineral sands** • Vigorously lobby for Richards Bay to host the pilot plant of the CSIR titanium powder production technology.	Number of communications issued through various channels on opportunities and incentives Number of engagements surrounding hosting the pilot plant for the CSIR titanium production plant Strategy to expand manufacture of components of passenger cars and midium & heavy commercial vehicles developed Number of mineral beneficiation industry clusters conferred SEZ status	A metals hub is established. Industrial support mechanisms to promote minerals beneficiation are implemented The auto supplier park is established, utilising locally manufactured products. An iron and steel company is attracted to the area.
1.2 Investigate pricing mechanisms and incentives that can be utilised to ensure availability of supply at competitive prices in priority minerals value chains	• Negotiate pricing with business as part and parcel of industrial support measures; • Negotiate and secure supply of metals to downstream industry players at developmental prices; • Investigate the effect of dumping of metal products on local minerals beneficiators and review the associated tariffs accordingly.	Number of negotiations with businesses on industrial support measures sucessfully concluded Number of engagements with relevant stakeholders on pricing considerations	Mechanisms are in place to allow for preferential pricing for local stakeholders Tariffs have been reviewed and recommendations made to ITAC

Objective	Programmatic intervention	Output indicators	Outcome indicators
1.3 Ensure that provisions for preferential local procurement are fully utilised to create markets for minerals beneficiated in KZN	• Ensure that suppliers to the KwaZulu-Natal government comply with the requirements of the NIPP and invest in local economic activities within the province; • Skill municipalities in developing tenders to include local content requirements in line with the provisions of the Preferential Public Procurement Finance Act (PPPFA), and thereafter in assessing tenders on local content during the adjudication processes; • Ensure that government officials developing tenders, particularly those in the target sectors of the IPAP, are clear on the process of verification and the need for specifying upfront whether the government department or the supplier will pay for verification (e.g. that suppliers be provided with the opportunity to charge the cost of verification over and above the amount bid for a tender); • Work with and encourage companies operating in the province to increase their local procurement spend on products manufactured in the Province.	Number of meetings of and recommendations from task force established to ensure compliance with NIPP and support investment in local economic activities Number of training courses and engagements with municipalities on increasing local requirements in issuing and adjudicating tenders. Number of workshops and engagements with companies in the province related to increasing local procurement spend	Increased local procurement spend by provincial and local government and the private sector in KZN
1.4 Streamline regulatory compliance	• Streamline EIA processes to ensure reasonable time to operations for mineral beneficiators; • Streamline water use licensing to ensure reasonable time to operations for mineral beneficiators; • Establish one-stop shop to provide regulatory assistance, coordinate and support the operations of mineral beneficiators in the province.	Number of individuals assisted at a facility to provide regulatory assistance to mineral beneficiators, including helping to streamline EIA and licensing processes.	Average time between application and approval of EIA licences

GOAL 2: IMPROVE COMPETITIVENESS AND ECO-EFFICIENCY OF BENEFICIATION PROCESSES AND PRODUCTS IN KZN

Objective	Programmatic intervention	Output indicators	Outcome indicators

2.1 Improve coordination along the prioritised value chains	• Organise a forum for value chain members, preferably one that meets frequently (e.g. quarterly) and/or online platforms and communication materials. The fora and/or communication platforms should:
	  ○ Promote an understanding of each producers' role in the value chain and create a shared vision of value chain opportunities;
	  ○ Identify blockages and work towards unblocking these;
	  ○ Identify relevant hubs and clusters and promote these (where these already exist), or identify where these would be beneficial and work towards their creation with the relevant agencies (Objective 2.2).
		Number of meetings of forum for value chain members.	

2.2 Improve partnerships and synergies between the prioritised value chains and other local industries	• Establish relevant mineral beneficiation and metal working clusters; • Support technology transfer initiatives to improve the operational efficiencies of mineral beneficiators; • Encourage local steel and ferroalloy manufacturers to form partnerships with local coal producers so as to investigate possibilities for locally mined coal to replace a portion of imported coke.	Number of mineral beneficiation and metal working clusters established and active. Number of interactions that promote technology transfer. Number of partnerships between local steel and ferroalloy manufacturers and local coal producers that lead to local procurement.	

Objective	Programmatic intervention	Output indicators	Outcome indicators
2.3 Invest in research and innovation across commodities, processes and functions	• Support the establishment of techno parks to promote industrialisation through commercialisation of research outputs; • Promote national government innovation programmes to stakeholders in the Province (e.g. through the monthly fora suggested in Objectives 2.1 and 2.2); • Investigate incentives for innovation so as to motivate companies to expand their R&D budgets allocated to province-specific innovation. **Mineral Sands (Titanium)** • Get involved in research towards the commercialisation of the CSIR titanium powder production technology, as well as in downstream application areas, such as 3D printing. **Phosphates** • Research technologies for the recovery of phosphates from human and animal wastes that translate to safe, socially and commercially viable secondary products. **Coal** • Conduct a detailed resource study on the availability and quality of the remaining coal resources in KZN; • Conduct a discard sampling study on the discard dumps prioritised for economic viability (building on the Discard Utilisation Study); • Research innovative niche markets for anthracite, especially with respect to its substitutability in metallurgical processes.	Number of techno parks established Number of events or media channels through which national government innovation is promoted to local stakeholders. Number/Rand value of incentive packages allocated to support increased R&D spend on province-specific innovation Total value of R&D spend on KZN-specific innovation	Rands of government innovation programmes procured in the Province R&D spend on locally relevant projects Detailed information available on coal and discards in the Province
2.4 Support the uptake of the latest technologies	• Develop mechanisms for sharing knowledge on latest technologies (e.g. through communication materials and monthly fora identified in Objectives 2.1 and 2.2); • Promote incentive structures for the uptake of new technologies (e.g. such as those around energy efficiency); • Work with industry and training colleges to ensure training programmes are up to date and relevant.	Number of engagements with industry aimed at supporting uptake of latest technologies Number of engagements facilitated between tertiary education institutions and companies with the aim of ensuring training programmes stay up to date and relevant	Capital expenditure on new technology investments

Objective	Programmatic intervention	Output indicators	Outcome indicators
2.5 Advance resource efficiency	• Establish and implement an industrial symbiosis programme in KZN; • Promote industrial ecology in planning of clusters, SEZs etc. *Actions under Objective 2.4 will also address this objective as new technologies typically advance material and energy efficiency*	Number of partners in the industrial symbiosis programme Tonnes of material and GJ of energy exchanges made possible by the industrial symbiosis programme	Presence of an active industrial symbiosis programme in the Province

GOAL 3: PROVIDE ADEQUATE INFRASTRUCTURE AND BULK SERVICES TO SUPPORT GROWTH OF THE MINERAL VALUE CHAINS

Objective	Programmatic intervention	Output indicators	Outcome indicators
3.1 Address availability and reliability of, as well as access to, infrastructure and services	**Ports** • Establish a container terminal at Richards Bay port to facilitate the exports of beneficiated products; • Support applications for port access from small coal miners wishing to export anthracite (e.g. though lobbying and facilitating negotiations). **Electricity and gas** • Establish a gas to power plant in Richards Bay to exploit the gas reserves in Mozambique; • Support alternative electricity generation sources in the Province, such as co-generation and own generation; • Attract alternative electricity generation to the Province by creating a conducive environment to Independent Power Producers (IPPs). **Water** • Investigate innovative water technologies to address water challenges, e.g. desalination, cascading water reuse/recycling and storm water harvesting; • Ensure water reticulation infrastructure is proactively maintained to reduce leakages and wastage. **Waste** • Ensure availability of appropriate special waste disposal facilities for by-products of minerals beneficiation; • Investigate value-adding water and waste treatment technologies, such as innovative technologies for producing fertiliser from human waste.	Number of small anthracite miners supported in applications for port access Number of alternative energy project such as co-generation and own generation to whom support is provided Number of engagements with potential IPPs Rand spend on addressing water savings and infrastructure Rand spend on value adding water and waste treatment technologies	Container terminal is established in Richards Bay port Gas power plant is established in Richards Bay Tonnes of anthracite exported by small coal miners GWh of electricity generated annually through co-generation, own generation and IPPs Ml fresh water savings
3.2 Reign in rising costs of water and electricity	• Assist companies with negotiating favourable (fair, appropriate) electricity pricing models with municipal providers; • Assist companies with negotiating fair water access and pricing models with municipal providers; • The electricity and water actions identified in Objective 3.1 above will also lower costs, in addition to improving reliability and access.	Number of facilitated engagements between companies and municipalities on negotiating fair electricity pricing, Number of facilitated engagements between companies and municipalities on negotiating water access and pricing	

GOAL 4: INCREASE AND SUSTAIN THE SKILLS BASE IN MINERALS BENEFICIATION IN KZN

Objective	Programmatic intervention	Output indicators	Outcome indicators
4.1 Increase the number of skilled artisans	• Identify critical shortages in artisanal skills in the metal-working industries, and to work with the FETs, SETAs and industry training programmes to expand and customise training programmes to meet the skills shortfalls; • Develop highly focussed and targeted SMME training; • Leverage specialised technical and vocational training through national and international partnerships; • Develop mentorship programmes where experienced artisans help young artisans develop work and life skills; • Facilitate increased in-house training and internships for artisanal training.	Number of industry training programmes established or adapted specifically to address shortages in artisanal skills Number of training courses run for SMMEs Number of artisans active in or having completed mentorship programmes Number of in-house training and internship opportunities for artisans	Number of artisans trained
4.2 Ensure training of professionals suited to industry needs	• Work with industry, universities and training colleges in the Province to ensure courses are relevant to minerals and manufacturing industries' needs; • Institute bursary programmes to increase the number of graduate professionals and engineers; • Institute bursary programmes for postgraduate training where advanced research skills are required, e.g. mineral sands (titanium); • Work with industry, universities and training colleges to run open-days/information sessions so that prospective students know about the opportunities in minerals beneficiation.	Number of engagements facilitated between tertiary education institutions and companies with the aim of ensuring courses are relevant to industries' needs Rand value of relevant bursary programmes Number of open days/ information sessions to communicate opportunities in minerals beneficiation to	Number of professionals graduating with KZN bursaries in mineral or materials-related fields Number of MSc's and PhDs graduating with KZN bursaries in mineral or materials-related fields

Objective	Programmatic intervention	Output indicators	Outcome indicators
		prospective students	
4.3 Facilitate retention of highly skilled professionals	• Provide recent graduates with information on opportunities in the Province (e.g. through open days with industry participation); • Design training and bursary programmes so that they include a commitment for recipients to work in the Province.	Number of open days and other communications on opportunities for professionals in the Province Rand value of training and bursary programmes which include a commitment to work in the Province	

GOAL 5: MAXIMISE DEVELOPMENT IMPACTS IN LOCAL COMMUNITIES FROM BENEFICIATION ACTIVITIES

Objective	Programmatic intervention	Output indicators	Outcome indicators
5.1 Develop and implement stakeholder compacts	• Audit and assess the effectiveness of stakeholder engagement processes (e.g. in SLPs, EIAs, EMPs etc.) for a selected number of sites; • Develop and road test a stakeholder compact on one site, with a view to establishing guidelines for best practice.	Number of assessments of the effectiveness of stakeholder engagement processes Development and road testing of a stakeholder compact	Number of stakeholder compacts developed
5.2 Work with companies, communities and local government stakeholders to identify and create opportunities for shared value	• Work with industry to review and modernise enterprise development programmes, e.g. through workshops, so that companies are up to date on recent thinking on creating shared value (CSV) for communities and stakeholders; • Provide training opportunities for companies on CSV.	Number of engagements and trainings with industry on enterprise development programmes and CSV	*Outcome (and possibly some output) indicators will need to be decided once individual community needs have been identified. These may relate to establishment of mental and physical health facilities and education programmes, crime prevention programmes, emergency services etc.* *Shared value outcomes will also be achieved through some of the other objectives, for example 4.1 to 4.3 and 6.1 and 6.2.*

GOAL 6: INCREASE THE PARTICIPATION OF PREVIOUSLY DISADVANTAGED INDIVIDUALS ALONG MINERAL BENEFICIATION VALUE CHAINS

Objective	Programmatic intervention	Output indicators	Outcome indicators
6.1 Train small business owners	• Design and offer accessible and relevant training courses in both technical and business skills; • Develop mentorship programmes where experienced business owners and industrialists provide targeted guidance for participating beneficiaries.	Number of small business owners trained Number of small business owners active in mentorship programmes	Number of small businesses in the minerals beneficiation sector in KZN
6.2 Procure locally where ever possible	• Work with industry to promote local procurement and address international businesses' procurement policies that exclude local providers (particularly relevant to OEMs); • Work with State Owned Enterprises to ensure local procurement takes place; • Support local service providers to communicate their service and product offerings to businesses operating in the Province; • Facilitate the registration of local businesses as suppliers on provincial and local government supplier databases. • Facilitate the identification of procurement and market opportunities for black owned enterprises and suppliers	Number of engagements with industry and SOEs on local procurement Number of local service providers who are assisted in communicating their product offerings.	Number of new registrations of local businesses on provincial and local government supplier databases Government and SOE spend on local procurment Average percentage of company spend on local procurement (companies operating in mineral and materials sector)
6.3 Ensure access to finance and markets for increased participation of black economic enterprises along the value chains	• Assist KZN black industrialists to tap into the national dti black industrialists programme; • Improve access by black industrialists to early stage capital and relevant non-financial support to develop projects bankability stage; • Assist black industrialists with market opportunities; • Train and build capacity in black entrepreneurs (as per Objective 6.1).	Number of black industrialists to whom assistance is provided related to minerals beneficiation in KZN Number of black entrepreneurs trained	Number of black-owned businesses in the minerals sector in KZN
Advance radical economic transformation	• Transform the ownership patterns along the mineral value chains • Facilitate the development of suppliers and enterprises along the mineral value chains	Number of new black suppliers and owned enterprises Transformed ownership	

Objective	Programmatic intervention	Output indicators	Outcome indicators
	• Ensure that employment and management control in the sector is reflective of provincial demographics • Establish a preferential fund to support acquisition of shares as a way of transforming the industry	patterns along mineral value chains	

Setting of baselines and targets for the indicators

Prior to implementing the strategy, targets will need to be set against which progress towards implementing the strategy is evaluated. As indicated previously, these will need to be set by the individuals responsible for implementing the strategy. For certain indicators that represent deviation from a current state (rather than a new activity being implemented), baselines may also need to be established prior to the implementation of the strategy. Where indicators relate to changes in company performance and spend, the setting of the baseline will need to consider the number of companies to be sampled, the sectors in which companies operate etc. for the change measurements to be meaningful. Initially companies in established fora could be used as the sample.

Further detail on setting of targets and baselines is provided in the tables that follow. For indicators that are considered self-evident (such as “A metals hub is established”), no further comments are provided in the table.

GOAL 1: CREATE A CONDUCIVE BUSINESS ENVIRONMENT FOR MINERAL VALUE CHAINS

Objective	Output indicators	Outcome indicators	Notes on targets and baselines
1.1 Exploit industrial support measures in attracting and retaining mineral beneficiators and associated industry	Number of communications issued through various channels on opportunities and incentives Number of engagements surrounding hosting the pilot plant for the CSIR titanium production plant Strategy to expand manufacture of components of passenger cars and midium & heavy commercial vehicles developed Number of mineral beneficiation industry clusters conferred SEZ status	A metals hub is established. Industrial support mechanisms to promote minerals beneficiation are implemented The auto supplier park is established, utilising locally manufactured products. An iron and steel company is attracted to the area.	A decision will need to be reached on the number of communications and engagements that are appropriate. In terms of communication, this should be regular and dynamic, rather than for example just a static webpage being developed. The target number of industrial support mechanisms to promote beneficiation will need to be decided. Here a baseline analysis to determine what is already in place is needed. For the auto supplier park, the target percentage of locally manufactured products used will need to be set
1.2 Investigate pricing mechanisms and incentives that can be utilised to ensure availability of supply at competitive prices in priority minerals value chains	Number of negotiations with businesses on industrial support measures sucessfully concluded Number of engagements with relevant stakeholders on pricing considerations	Mechanisms are in place to allow for preferential pricing for local stakeholders Tariffs have been reviewed and recommendations made to ITAC	A decision will need to be made on the target number of negotiations and engagements.

Objective	Output indicators	Outcome indicators	Notes on targets and baselines
1.3 Ensure that provisions for preferential local procurement are fully utilised to create markets for minerals beneficiated in KZN	Number of meetings of and recommendations from task force established to ensure compliance with NIPP and support investment in local economic activities Number of training courses and engagements with municipalities on increasing local requirements in issuing and adjudicating tenders. Number of workshops and engagements with companies in the province related to increasing local procurement spend	Increased local procurement spend by provincial and local government and the private sector in KZN	Targets for the output indicators will have to be decided upon For the outcome indicator, align work on targets and baselines with this goal in the IPAP 2016/17
1.4 Streamline regulatory compliance	Number of individuals assisted at a facility to provide regulatory assistance to mineral beneficiators, including helping to streamline EIA and licensing processes.	Average time between application and approval of EIA licences	Target for number of individuals assisted will have to be decided on A baseline for current time of processing EIA licenses will be need to be established and a reasonable target be set in collaboration with the relevant unit handling the applications

GOAL 2: IMPROVE COMPETITIVENESS AND ECO-EFFICIENCY OF BENEFICIATION PROCESSES AND PRODUCTS IN KZN

Objective	Output indicators	Outcome indicators	Notes on targets and baselines
2.1 Improve coordination along the prioritised value chains	Number of meetings of forum for value chain members.		Meetings should be held at least quarterly. The target number of meetings can be decided during the establishment of the fora
2.2 Improve partnerships and synergies between the prioritised value chains and other local industries	Number of mineral beneficiation and metal working clusters established and active. Number of interactions that promote technology transfer. Number of partnerships between local steel and ferroalloy manufacturers and local coal producers that lead to local procurement.		Targets will need to be established There may be value in establishing a baseline on the existing interactions that promote technology transfer

Objective	Output indicators	Outcome indicators	Notes on targets and baselines
2.3 Invest in research and innovation across commodities, processes and functions	Number of techno parks established Number of events or media channels through which national government innovation is promoted to local stakeholders. Number/Rand value of incentive packages allocated to support increased R&D spend on province-specific innovation Total value of R&D spend on KZN-specific innovation	Rands of government innovation programmes procured in the Province R&D spend on locally relevant projects Detailed information available on coal and discards in the Province	Baselines will need to be established for all information related to existing spend prior to setting targets for relevant indicators Targets for number of techno parks and communications will need to be established
2.4 Support the uptake of the latest technologies	Number of engagements with industry aimed at supporting uptake of latest technologies Number of engagements facilitated between tertiary education institutions and companies with the aim of ensuring training programmes stay up to date and relevant	Capital expenditure on new technology investments	Target number of engagements will need to be decided upon. Quarterly meetings/ communications may be appropriate here
2.5 Advance resource efficiency	Number of partners in the industrial symbiosis programme Tonnes of material and GJ of energy exchanges made possible by the industrial symbiosis programme	Presence of an active industrial symbiosis programme in the Province	Targets on tonnes of material and GJ of exchanges may need to be established with inputs from partners in the programme and with outside inputs from those with experience elsewhere such as GreenCape

GOAL 3: PROVIDE ADEQUATE INFRASTRUCTURE AND BULK SERVICES TO SUPPORT GROWTH OF THE MINERAL VALUE CHAINS

Objective	Output indicators	Outcome indicators	Notes on targets and baselines
3.1 Address availability and reliability of, as well as access to, infrastructure and services	Number of small anthracite miners supported in applications for port access Number of alternative energy project such as co-generation and own generation to whom support is provided Number of engagements with potential IPPs	Container terminal is established in Richards Bay port Gas power plant is established in Richards Bay Tonnes of anthracite exported by small coal miners	A number of baselines will be required to be established here

Objective	Output indicators	Outcome indicators	Notes on targets and baselines
	Rand spend on addressing water savings and infrastructure Rand spend on value adding water and waste treatment technologies	GWh of electricity generated annually through co-generation, own generation and IPPs Ml fresh water savings	
3.2 Reign in rising costs of water and electricity	Number of facilitated engagements between companies and municipalities on negotiating fair electricity pricing, Number of facilitated engagements between companies and municipalities on negotiating water access and pricing		The target number of engagements will have to be decided upon here

GOAL 4: INCREASE AND SUSTAIN THE SKILLS BASE IN MINERALS BENEFICIATION IN KZN

Objective	Output indicators	Outcome indicators	Notes on targets and baselines
4.1 Increase the number of skilled artisans	Number of industry training programmes established or adapted specifically to address shortages in artisanal skills Number of training courses run for SMMEs Number of artisans active in or having completed mentorship programmes Number of in-house training and internship opportunities for artisans	Number of artisans trained	Baselines will be required for all of the indicators under this goal Targets will need to be set in conjunction with an understanding of industry needs
4.2 Ensure training of professionals suited to industry needs	Number of engagements facilitated between tertiary education institutions and companies with the aim of ensuring courses are relevant to industries' needs Rand value of relevant bursary programmes Number of open days/ information sessions to communicate opportunities in minerals beneficiation to	Number of professionals graduating with KZN bursaries in mineral or materials-related fields Number of MSc's and PhDs graduating with KZN bursaries in mineral or materials-related fields	A baseline on the rand value of bursary programmes is required

Objective	Output indicators	Outcome indicators	Notes on targets and baselines
	prospective students		
4.3 Facilitate retention of highly skilled professionals	Number of open days and other communications on opportunities for professionals in the Province Rand value of training and bursary programmes which include a commitment to work in the Province		A baseline will be required on the rand value of training bursary programmes that include a commitment to work in the Province, as well as the number vacancies for skilled professionals

GOAL 5: MAXIMISE DEVELOPMENT IMPACTS IN LOCAL COMMUNITIES FROM BENEFICIATION ACTIVITIES

Objective	Output indicators	Outcome indicators	Notes on targets and baselines
5.1 Develop and implement stakeholder compacts	Number of assessments of the effectiveness of stakeholder engagement processes Development and road testing of a stakeholder compact	Number of stakeholder compacts developed	The target for the number of stakeholder compacts to be developed will require information on the number of facilities which would require such compacts, as well as the number that are already in place
5.2 Work with companies, communities and local government stakeholders to identify and create opportunities for shared value	Number of engagements and trainings with industry on enterprise development programmes and CSV	*Outcome (and possibly some output) indicators will need to be decided once individual community needs have been identified. These may relate to establishment of mental and physical health facilities and education programmes, crime prevention programmes, emergency services etc.* *Shared value outcomes will also be achieved through some of the other objectives, for example 4.1 to 4.3 and 6.1 and 6.2.*	Targets will need to be developed in the context of an understanding of how many relevant organisations there are in the Province that would benefit from such training. Baselines for outcome indicators will need to be decided upon once the indicators have been finalised.

GOAL 6: INCREASE THE PARTICIPATION OF PREVIOUSLY DISADVANTAGED INDIVIDUALS ALONG MINERAL BENEFICIATION VALUE CHAINS

Objective	Output indicators	Outcome indicators	Notes on targets and baselines
6.1 Train small business owners	Number of small business owners trained Number of small business owners active in mentorship programmes	Number of small businesses in the minerals beneficiation sector in KZN	Targets will need to be set in the context of an understanding of the number of small businesses in the sector in the Province
6.2 Procure locally where ever possible	Number of engagements with industry and SOEs on local procurement Number of local service providers who are assisted in communicating their product offerings.	Number of new registrations of local businesses on provincial and local government supplier databases Government and SOE spend on local procurment Average percentage of company spend on local procurement (companies operating in mineral and materials sector)	Targets for number and frequency of engagements will be required A baseline for registration of local businesses on supplier databases and the Rands spent on local procurement will need to be established
6.3 Ensure access to finance and markets for increased participation of black economic enterprises along the value chains	Number of black industrialists to whom assistance is provided related to minerals beneficiation in KZN Number of black entrepreneurs trained	Number of black-owned businesses in the minerals sector in KZN	Targets will need to be set here in the context of an understanding of the number of suitable candidates for training and assistance. As such baseline data may be required here
6.4 Advance radical economic transformation along the mineral value chains	Number of new black suppliers and owned enterprises Transformed ownership patterns along mineral value chains		Targets will need to be set to gauge the extent of transformation along the mineral value chains

Frequency of and responsibility for reporting

Given that the strategy is to be implemented over the relatively short period of five years, it is recommended that reporting be undertaken annually. The individuals responsible for the achievement of the five goals are ultimately responsible for collating the information required for measuring progress against the targets. The reporting channels will align with other performance reporting within the department.