

# MINERAL BENEFICIATION

PORTFOLIO COMMITTEE ON TRADE AND INDUSTRY

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the dtic

Department  
Trade, Industry and Competition  
REPUBLIC OF SOUTH AFRICA

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# DELEGATION

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# ABBREVIATIONS

- MPRDA - Mineral Petroleum Resources Development Act
- PPPFA - Preferential Procurement Policy Framework
- DMRE – Department of Mineral Resources and Energy
- DSI – Department of Science and Innovation
- IDC – Industrial Development Corporation
- DOT – Department of Transport
- DPE – Department of Public Enterprises
- HySA – Hydrogen South Africa
- PGM – Platinum Group Metals
- RDI – Research Development and Innovation
- IDZ – Industrial Development Zone
- EL - East London
- NW – North West
- tpa – tons per annum

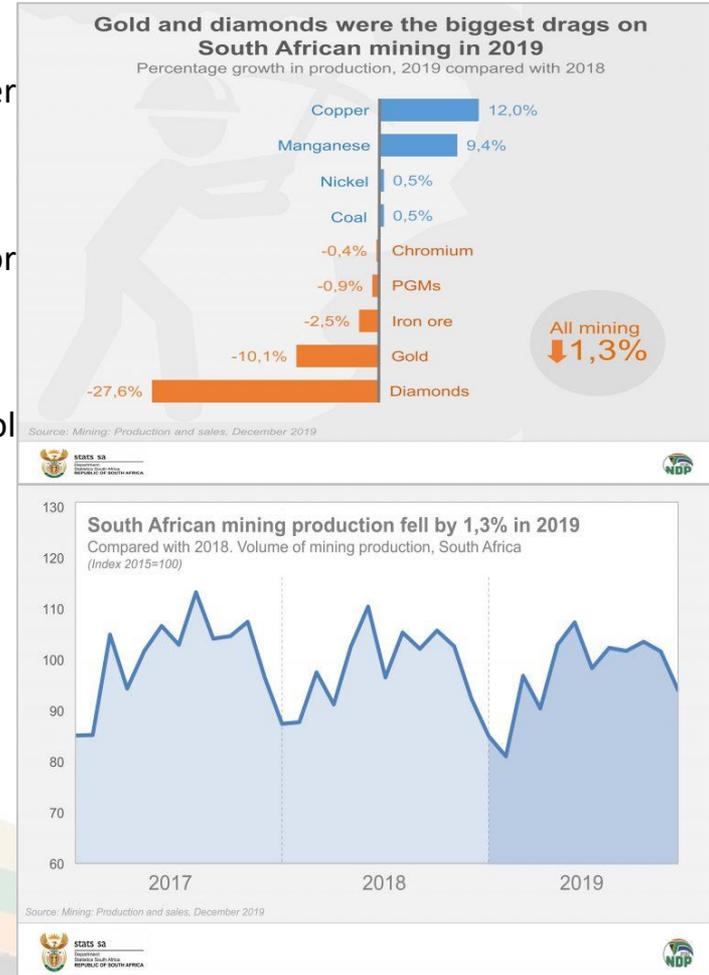


# 1. POLICY CONTEXT

- ❑ South Africa's richest mineral endowment: the country has the largest share of the world's platinum & manganese and large shares of chrome, vanadium reserves - currently estimated at around US\$ 2.5 trillion.
- ❑ The comparative advantage from a national resource endowment has not been fully leveraged to build a dynamic industrial economy - the backward, forward and side stream linkages.
- ❑ Value addition/ beneficiation is not a new phenomenon → Mineral Energy Complex (the establishment of Iscor, Sasol, Aluminium and Ferrochrome smelters, etc.) as a key evolution of SA's industrial development was backed by certain policy choices.
- ❑ What are the key policies driving beneficiation:
  - ❑ Mineral Petroleum Resources Development Act (MPRDA);
  - ❑ Mining Charter;
  - ❑ SA Beneficiation Strategy;
  - ❑ **the dtic** role.

## 2. 2019 SITUATIONAL ANALYSIS

- ❑ Mining production 1,3% lower in 2019 than 2018, which was 2,1% lower than 2017, 8% of GDP (down from 15% in 1990).
- ❑ Employment declined by 70,000 people to currently about 464,000.
- ❑ SA accounted for 1% of total global exploration expenditure (14% for Canada & Australia, 13% for the rest of Africa).
- ❑ Top three mineral sales - coal, platinum group metals & gold.
- ❑ High rhodium & palladium prices - strict emission laws, more petrol fewer diesel engines, platinum impacted by electric vehicles.
- ❑ 2019 World demand for coal fell – countries opt for renewables.
- ❑ Iron-ore prices increased due to shortages.
- ❑ Increased metal substitution and recycling.
- ❑ Megatrends: digitalisation, decarbonisation creating new demand;
  - ❑ Demand for battery metals driven by the battery revolution;
  - ❑ Opportunities for fuel cells.
- ❑ The integration of advanced mining technology to remain competitive.
- ❑ Social, investor & regulatory pressure to reduce environmental impact.



### 3. KEY CHALLENGES

- ❑ How does SA leverage the comparative advantage from a national resource endowment to build a dynamic industrial economy.
- ❑ Supportive policy and legislative regime for domestic value-addition is key.
- ❑ Input prices of key minerals and metals places local manufacturers at a disadvantageous position relative to foreign manufacturers, especially considering their competitive advantages in other factors of production.
- ❑ SA beneficiation dependent on energy intensive stages of smelting and refining impacted by increases in electricity prices.
- ❑ Mining equipment imports. Local supply of inputs (capital goods, consumables and services ) along the minerals value chain (especially upstream), presents a massive opportunity for the SA economy.
- ❑ Significant decline in technology, research & development in SA over last 20 years.
- ❑ Transport and logistics costs – pricing, layout/network and operations of logistics infrastructure favourable for raw material exports but expensive, inefficient and inadequate for value added goods and local beneficiaries.



## 4. RE-IMAGINED INDUSTRIAL STRATEGY

- ❑ **POTENTIAL IMPACT:** Significant R&D, technology and capability applications, increased exports, employment.
- ❑ Judicious use of export taxes, to support beneficiation & protect infrastructure (scrap metal).
- ❑ Policy Coordination to unlock downstream beneficiation opportunities.
- ❑ Enhance our sustainable local manufacturing sector for platinum based fuel cells and their sub-components:
  - Fuel cell initiative will contribute significantly to job creation, skills and technology development;
  - Improved environmental conditions through reduced water consumption and a reduced carbon footprint, including energy security.
- ❑ Develop a local battery manufacturing industry to support utility-scale & automotive energy storage.
- ❑ Rejuvenation of the Iron Ore and Steel Beneficiation Value Chain.
- ❑ Rejuvenation of the Polymer Beneficiation Value Chain.

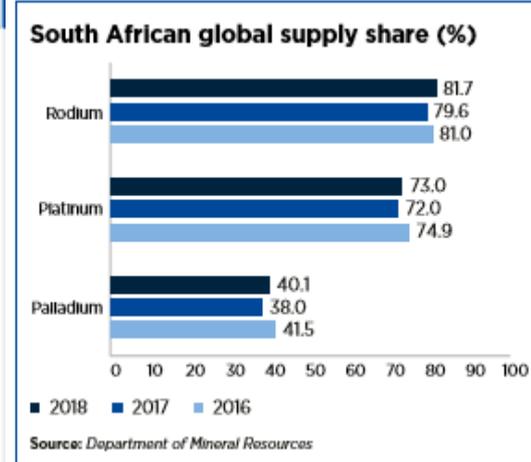
# 5. POLICY INTERVENTIONS

OBJECTIVES	POLICY/PROGRAMME LEVERS
Ensure security of supply at competitive prices for local manufacturers	DMRE License conditions, MPRDA Competition Commission, ITAC and NT for export taxes DPE/DOT – ports/rail access and expansion aligned to objectives
Support new investments with incentives, industrial finance	IDC DTIC – Black Industrialists programme, SEZs
Localisation and supplier development	NT– Preferential Procurement Policy Framework (PPPFA) and designations to meet objective for public procurement DMRE– Mining Charter DPE and DOT – Shareholder instructions and compacts DTIC – Designation, B-BBEE codes
Accelerate mining capital equipment exports to Africa	DTIC – Export Councils and initiatives to promote exports
R&D, technology development	DSI – Technology support programmes
Electricity, rail, port tariffs	DPE – rail and port tariffs DMRE – short and long term framework for energy intensive users

## 6. PLATINUM-BASED FUEL CELLS

- ❑ South Africa has more than 80% of the world's platinum (Pt) reserves.
- ❑ Largest platinum mining companies in SA.
- ❑ Large employer and export revenue generator.
- ❑ Support the long term sustainability and growth of the industry.
- ❑ Industry is threatened by future decline in combustion engine vehicles.
- ❑ New applications and markets for platinum group metals (PGM's) that can transform the industry beyond the current dependence on demand from catalytic converter.
- ❑ Objective: To create a sustainable local manufacturing sector for Pt based fuel cells and its sub-components by beneficiating SA PGM minerals through appropriate mechanisms that can support a local and global market.

Commodity	Employment
Gold	112,200
PGMs	175,770
Iron ore	21,794
Chrome	17,535
Manganese	8,314
Diamonds	18,227
Coal	81,962
Aggregate and sand	7,390
Other mines and quarries	21,475
<b>Total</b>	<b>464,667</b>



Source: 2017 statistics, DMR

### Fuel Cell opportunity for SA

- increased PGM demand, mining growth
- mineral beneficiation
- transition to clean energy (climate change and GHG commitments)

# 6. PLATINUM-BASED FUEL CELLS

## RDI AND SKILLS DEVELOPMENT

Department of Science and Innovation and HySA leading RDI and human capital development  
HySA Catalysis  
HySA System  
HySA Infrastructure

## DEMONSTRATION

Key projects aligned to the roadmap are being pursued by the mining companies and government

100KW demonstration at Chamber of Mines and others

Incentives:  
SPII (Support programme for industrial innovation)  
Critical Infrastructure Fund  
SEZ incentives

## EARLY MARKET ADOPTION AND DEVELOPMENT

Efforts to secure demand by the public sector and private sector (mining, industrial operations, transport and bus applications)

## INVESTMENT PROMOTION WITH KEY GLOBAL TECHNOLOGY PARTNERS

The DTIC is engaging with fuel cell manufacturers for localisation in SA

## INFRASTRUCTURE, FUEL AND METAL AVAILABILITY

hydrogen, natural gas, methanol

Hydrogen can be produced on site or at a central production facility using renewables

Springs Industrial Park linked to Gauteng IDZ close to refineries. Secured access to metal, recycling, suppliers, natural gas, transport, logistics for export. SEZ incentives will also be available

## 6. FUEL CELL FOCUS AREAS

### Telecommunication and rural

- ❑ Over 300 units deployed at Vodacom off-grid sites.
- ❑ SA currently has the second largest deployment of fuel cells in Telecoms and potential to grow.
- ❑ SSA – > 60 million households.

### Mobility (busses, trucks, mining equipment)

- ❑ Most realistic market for early adoption.
- ❑ Fuel cells offer a technical advantage for heavy vehicles, extend the range of electric vehicles.
- ❑ Cost comparable over conventional technologies over long.

- ✓ Project well underway for development of fuel cell manufacturing facilities in Dube Trade Port to service existing and new telco customers in 2020
- ✓ Project supported by Critical Infrastructure Programme and NIP to commercialise fuel cell membrane manufacture

- ✓ Green Hydrogen Transport Program (Green Fund)
- ✓ Planned transportation initiatives with mines, major bus and truck fleet owners
- ✓ Local bus company developing a hybrid solution (battery with fuel cell range extender) for busses
- ✓ Roadmap in collaboration with Gautrain who have purchased busses that can be retro-fitted with battery/fuel cell system

# 7. ENERGY STORAGE: LOCAL BATTERY MANUFACTURING

- ❑ Mineral based green energy solutions are gaining momentum driven by the global response to Climate Change and Green House Gas commitments.
- ❑ Vanadium, lithium, cobalt, manganese, nickel and rare-earths are sought after metals in the battery materials market.
- ❑ Given SA and the regions resources of these minerals, projects are being pursued by government, the IDC and industry.
- ❑ Focus areas – stationery/utility and mobility application:
  - ❑ Vanadium redox flow batteries;
  - ❑ Nickel Sulphate material for lithium-ion batteries;
  - ❑ Manganese precursor projects for lithium-ion batteries.

MINE → METAL PRECURSOR → BATTERY

- ✓ 8 million litre vanadium electrolyte manufacturing plant in the EL IDZ –supported by the IDC
  - The plant will process vanadium oxide from South Africa and use other locally manufactured reagents (e.g. sulphuric acid)
  - Plan to start production by end of 2020
  - Precursor for vanadium redox flow batteries
- ✓ 25 000 tpa pure nickel sulphate plant supported by the Black Industrialist Programme
  - The plant will process nickel by-product from platinum mining producing battery grade material in Brits, NW for export market
  - Mintek propriety process
  - The construction of the plant is complete and production expected to commence in 2020/21

## 8. OTHER BENEFICIATION PROJECTS

### MANGANESE

- ❑ Manganese Metal company beneficiates ore and supplies local steel mills and global battery market.
- ❑ Potential Manganese precursor and battery manufacturing facility in Coega IDZ.

### TITANIUM

- ❑ Planned titanium dioxide pigment manufacturing in Richards Bay IDZ supported by **the dtic** Critical Infrastructure Programme.
- ❑ 80 000 tpa of titanium dioxide pigment for local and export markets utilising Highveld stock-piled discarded material.
  - The project involves the construction of a Technical Development Centre which will house Nyanza’s research & development labs, pilot and demonstration plant in 2020.
  - The construction of the titanium dioxide pigment manufacturing plant, will commence in 2022.

### RARE EARTHS

- ❑ IDC in collaboration with Mintek is undertaking the Mine-to-Magnet (“M2M”) value chain pre-feasibility study for the manufacturing of rare-earth magnets in SA for the global automotive market.

## 9. MINING EQUIPMENT

- ❑ Strong backward and forward linkages, high levels of value add, productivity levels and labour intensive.
- ❑ South African firms are competitive, significant technological capabilities and exports in mineral processing equipment, off-road specialised equipment, pumps, valves and conveyor systems.
- ❑ SADC countries produce two-thirds of Africa's mineral exports by value. South Africa's mining sector is currently the largest on the continent, and largest for underground mining equipment.
- ❑ Imports grew from 2009 to 2018, SA imported US\$ 3.5 bn of mining and machinery equipment in 2018 and SADC US\$ 7.5 bn.
- ❑ Interventions include:
  - ❑ Localisation and supplier development;
  - ❑ Cluster programs;
  - ❑ Local content verification;
  - ❑ Export roadmap.

# 10. STEEL CONTEXT

- The beneficiation of South Africa's raw materials is a major thrust of its industrial policy and linkages can be strengthened by developing manufacturing capabilities throughout the steel supply chain.
- Scope for development within the steel supply chain can be found between mining, construction, infrastructure, automotive, packaging and capital equipment.
- Due to the enormous backward and forward linkages, the value chain is central to any industrialisation path and is a key driver of competitiveness.
- The carbon- and stainless-steel fabrication sector is fundamental to manufacturing in SA, with products and applications used across the entire economy.
- Re-imagined industrial strategy – prioritises steel value chain.

# 10. STEEL INTERVENTIONS

CURRENT INTERVENTIONS	STATUS
<ul style="list-style-type: none"> <li>Designations and Localisation</li> </ul>	<ul style="list-style-type: none"> <li>Undeemed primary steel in the early rounds of designations to encourage the use of locally manufactured primary steel.</li> <li>All major steel intensive products are designated under the PPPFA</li> <li>Localisation potential in rail, water and mining projects. Highveld rail capability to supply mainline rail.</li> </ul>
<ul style="list-style-type: none"> <li>Steel Competitiveness Fund</li> </ul>	<ul style="list-style-type: none"> <li>Established a R1.5 bn Fund in 2017 to support upgrading, working capital requirements, investments and key downstream steel sectors in distress</li> </ul>
<ul style="list-style-type: none"> <li>SARS Reference Price System</li> </ul>	<ul style="list-style-type: none"> <li>To address low priced imports and inter-agency working group established to tackle illegal trade</li> </ul>
<ul style="list-style-type: none"> <li>Flat steel pricing</li> </ul>	<ul style="list-style-type: none"> <li>Agreement in 2017 - flat steel is priced appropriately for steel-dependent industries to be competitive while ensuring that the upstream steel mills remain sustainable</li> </ul>
<ul style="list-style-type: none"> <li>Trade Policy (tariffs and trade remedy)</li> </ul>	<ul style="list-style-type: none"> <li>Increase in the general rate of customs duty on primary steel products to 10% and safeguard measures on hot rolled coil and plate products</li> <li>Tariff increases on downstream products to the bound rates; trade remedies; deployment of rebates on products not manufactured or value added before export</li> </ul>
<ul style="list-style-type: none"> <li>Maintain strategic capability</li> </ul>	<ul style="list-style-type: none"> <li>Highveld Steel intervention saved a major industrial complex and intervention in Scaw to maintain strategic capability in primary steel, grinding media and cast products for rail and mining</li> </ul>

# 10. PROPOSED EXPORT TAX ON SCRAP METALS

- ❑ Government has and continues to put in place measures to support the beneficiation and availability of affordable scrap metal to foundries and mills.
- ❑ A Price Preference System (PPS) administered by ITAC has been in place since 2013 regulating the exportation of ferrous and non-ferrous scrap, not allowing the exportation of scrap metal unless it has first been offered to domestic consumers.
- ❑ Commitment to an export tax on scrap metal was announced during the 2019 Job Summit to improve the availability of better-quality scrap metal at affordable prices for domestic foundries and mills.
- ❑ An independent impact assessment was done on the export tax and found a significant net benefit. ITAC completed its review of the export tax and recommended its implementation.
- ❑ A Price Preference System has been extended up until December 2020.
- ❑ Export tax was announced by Minister Tito Mboweni during the 2020 Budget Speech, implementation modalities are being finalised. Industry/public consultation processes will be in 2 phases:
  - ❑ The first phase was initiated by NT but is delayed due to COVID-19;
  - ❑ The second phase will commence with the publication of the Taxation Laws Amendment Bill.

# 10. STEEL & METAL FABRICATION SECTOR MASTER PLAN PROCESS

- Engagements have been held with industry in developing the existing interventions provided to the steel value chain.
- We continue to partner with labour and industry in the development of the Masterplan and social compact – Phase 1 to be completed within this financial year:
  - The Masterplan aims to support the medium to long-term growth, development and sustainability of the value chain;
  - Turnaround action-oriented plan based on identified competitiveness improvements, measures to increase demand, reduce levels of imports and reposition the industry to be resilient under the intense global pressures;
  - Through the masterplan process, action plans and reciprocal commitments to be secured and implemented with business and labour in stages, in order to move with the requisite urgency to boost growth and support job retention in the value chain.

# 11. POLYMER BENEFICIATION

*In SA, SASOL produces polymers (polypropylene and polyethylene) from natural gas and coal. Polymers are beneficiated into plastics, widely used in various sectors presenting opportunities*

## **Key Projects**

- Polypropylene compounding facility which will be supplying Volkswagen South Africa has established.
- Designation of Plastics Pipes that came into effect in September 2019.
- Localisation of essential PPEs like body bags, bio-hazard bags, face shield, aprons etc.
- New Fuel tank manufacturing production for Mercedes Benz secured.
- Polypropylene beneficiation applications in other sub-sectors like non-woven , white goods interior ready for feasibility studies by IDC & Sasol.
- A draft Plastics Masterplan has been developed through a social compact with the intention of securing reciprocal commitments: to be completed within this financial year.
- A risk engine with SARS & the Industry Body has been developed to deal with mis-declaration, under-invoicing.

## 12. CONCLUDING REMARKS

- ❑ In various minerals, the stages of value addition vary in technology, capital and energy intensities and know-how and product markets as well as employment intensity.
- ❑ Each stage can provide enormous competitive advantages in the forward linkages and contribute to building a dynamic and competitive manufacturing sector.
- ❑ To fully leverage the opportunities in each stage, government must create an enabling environment through supportive policy, legislative regime (energy, transport, trade policies) and targeted industrial financing support.
- ❑ Beneficiation embodies long-term programmes that require a committed private sector with developmental interests to invest for the long-haul.





**THANK YOU**



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