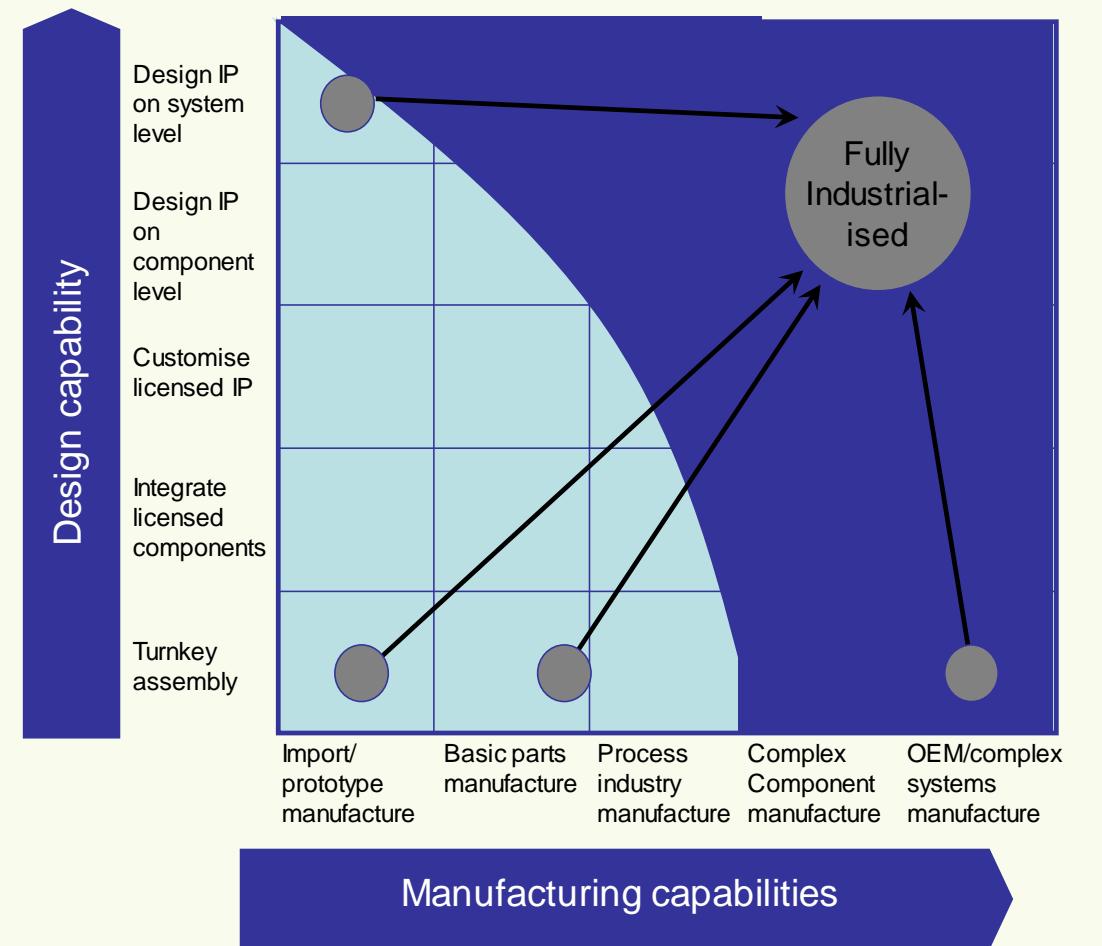


Rebuilding the South African Mining Cluster

Industrialisation is the process of systematically increasing the ability of an economy to competitively design, manufacture and service products of increasing complexity and value.



Industrialised economies have the ability to efficiently develop and deploy technologies to do more with less

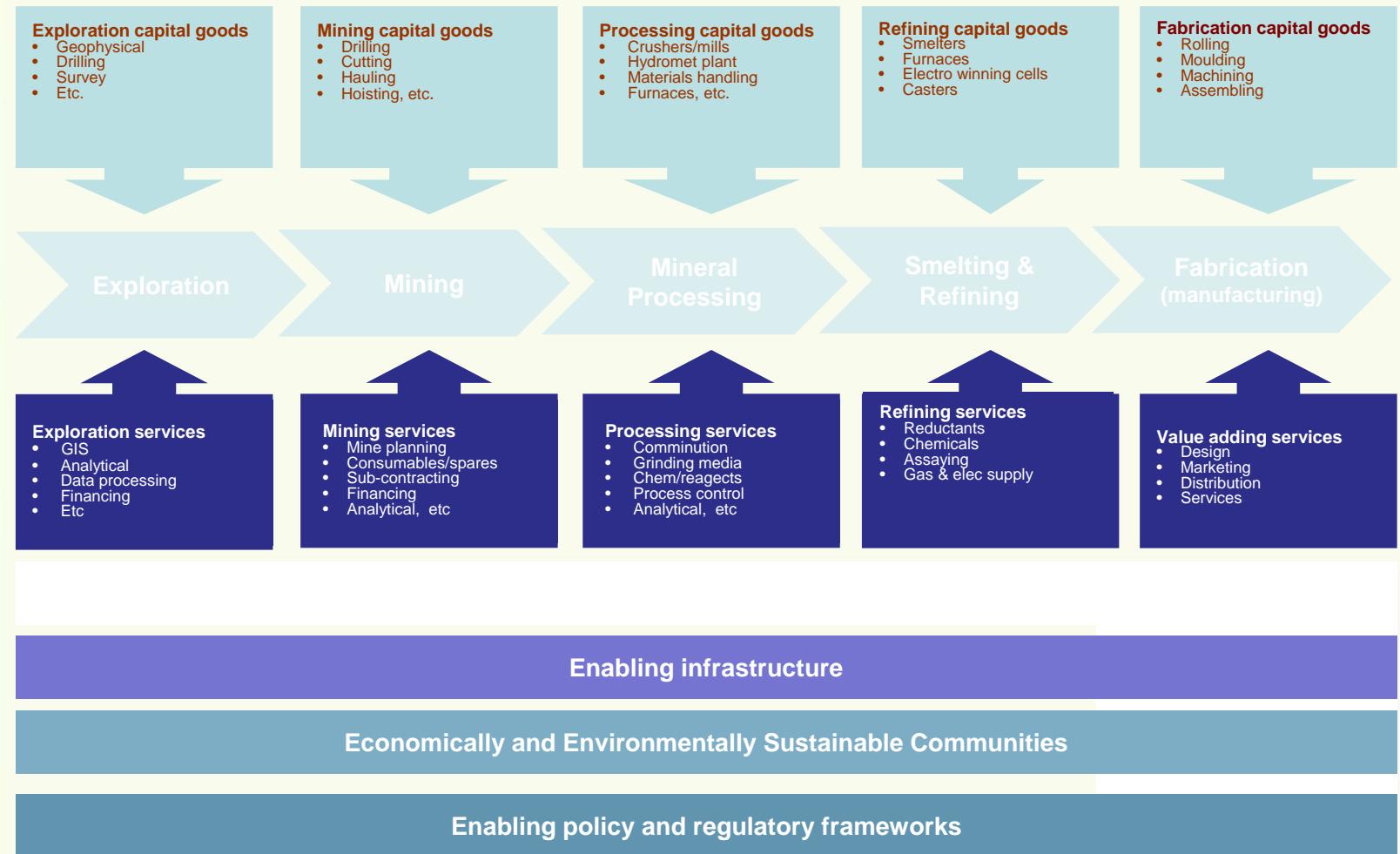
Manufacturing, Mining and Agriculture

- Mining, manufacturing and agriculture are converging in terms of the industrial and technologically complex nature of production.
- It no longer makes sense to think of manufacturing as a unique driver of technological learning.
- The issue is how technological sophistication in one sector can drive developments in other sectors.
- The mining Phakisa needs to be understood in this context.



The Mining Cluster

The competitiveness of the mining cluster will ultimately be determined by the weakest element of the system in which the core business of mining takes place



Mining Challenges

- The dramatic decline in commodity prices is leaving many South African mines exposed as being inadequately competitive.
- Easy accessible resources, especially in gold are becoming depleted – need to develop new technologies to access deeper levels.
- There is a need to improve safety.
- Certain bulk commodities can no longer compete with cheap global producers – South Africa needs to beneficiate much of its product to differentiate itself.
- Industrial relations in many mines are fraught which makes the repositioning of the industry difficult.
- South Africa's mining technology development capacity both in design and manufacture has been degraded, although a foundation for development remains.
- Relationships with mine proximate communities are often conflict ridden threatening the sustainability of operations.

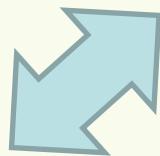


The South African mining cluster is at a water-shed and faces the challenges of re-inventing itself

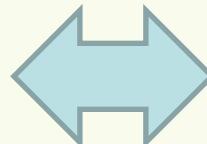
Problem Statement

The mining industry is facing three fundamental strategic challenges.

The mining industry needs to modernise existing operations and gear itself up for the next generation of mining systems and technologies in a context where the culture, business processes and skills profile of many enterprises were forged in a racially exclusive, legacy environment.



In the context of a fragmented, state, the mining industry is suffering from extreme political isolation and does not have the credibility, capability, enabling culture and resources to build bridges with key stakeholders whose support is required for the sustainability of the industry.



In the context of a degraded cluster, the mining sector needs to actively intervene to build national research and development, skills development, upstream equipment and service supplier capabilities and down-stream beneficiation industries to secure the sectors long term sustainability and competitiveness.

Phakisa Problem Statement

The Phakisa had the task of developing collaborative solutions in response to the mining cluster challenges.

Broad Objective

The broad aim of the Mining Phakisa as a whole is to galvanise growth, transformation, investment and employment creation along the entire mining value chain, in relevant input sectors and in mining related communities.

Problem Statement

In the context of a mining cluster facing deep seated economic and socio-economic historical, structural and immediate challenges, the Phakisa has the challenge of developing collaborative interventions that will meaningfully impact on the short and medium term challenges faced by the mining cluster and putting in place institutional mechanisms that will entrench the collaboration.

Compliance versus Collaboration

The Phakisa approach is to build coalitions of key stakeholders in the mining cluster to enhance the competitiveness of the industry as well as its developmental impacts.

Compliance Logic

- Operates through threat
- Company focus
- Objective is to comply
- Company acts in relative isolation.
- Focus on ticking boxes
- Focus on individual, easy to measure, projects of limited ambition
- Funding through mining company balance sheet.
- Creativity unlocked in finding loopholes in compliance framework – does not encourage integrity

Collaborative Logic

- Operates through finding common cause.
- Cluster focus
- Objective is to solve the problem
- Partnership and coalition building focus
- Focus on innovation and impact
- Focus on transformational programs, regional and cluster development.
- Funding based on which stakeholder is best equipped to manage risk and optimise value.
- All stakeholders need to act with integrity, transparency and accountability.

What matters is what you can get a critical coalition of stakeholders to agree on – this has serious implications for the design of industrial policy

The Phakisa

The Phakisa has designed a holistic program to develop the mining cluster whilst securing and improving the livelihoods of all key stakeholders

Developing new technologies to enhance productivity and safety for both current mines and for future ultra deep level operations

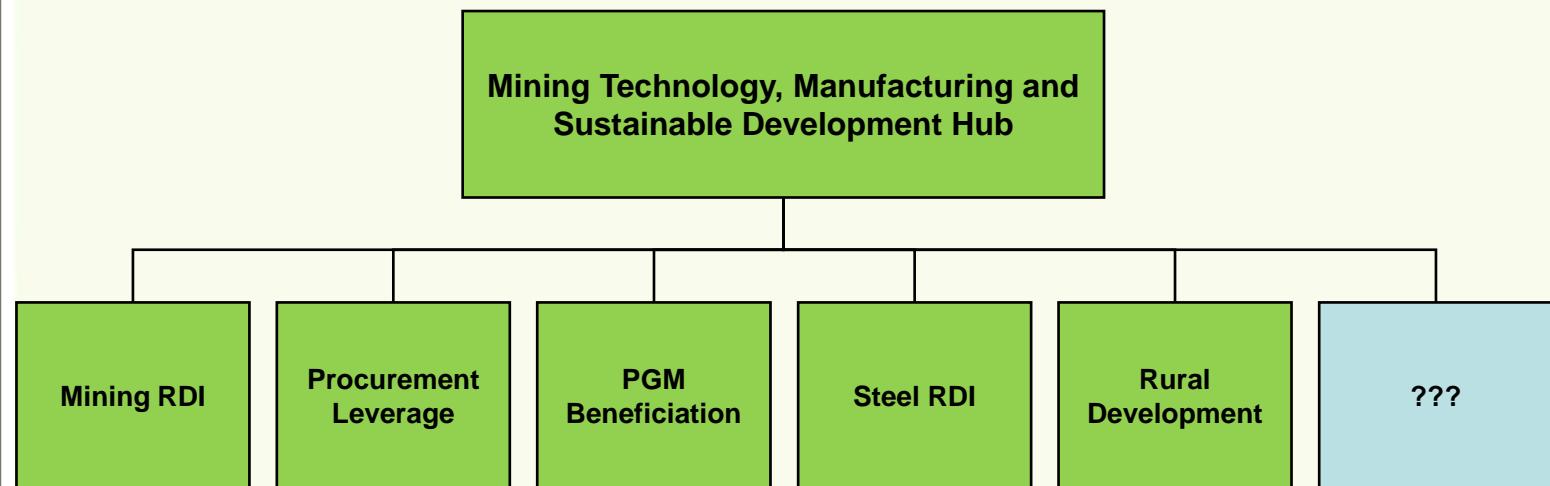
Developing and expanding the national mining supply chain with an emphasise on exports and “local to site” activities.

Increasing beneficiation in key value chains to build national technology capability, manufacturing and exports.

Building a large scale agri-industrial cluster to create quality jobs, enhance food security and increase exports.

The Hub

Post the Phakisa, the Mining Technology, Manufacturing and Local Economic Development Hub has been launched to act as an enabler of collaborative interventions that will contribute to build the next generation mining cluster



The Hub functions through convening and supporting collaborative forums – the focus is to get stakeholders to deploy the hub when they see a need

- Fully functional
- Being established

The Mining Precinct & the Mining Hub

- The Hub is based as the former headquarters of the Chamber of Mines in Carlow Road which was transferred to the CSIR.
- CSIR Mining-Tech, Ventilation Society of South Africa, Geological Society of South Africa, Mining Engineering and Manufacturing Society of South Africa and Coaltech presently based at the Hub.
- Rentals for relevant organisations subsidised heavily by the DST.



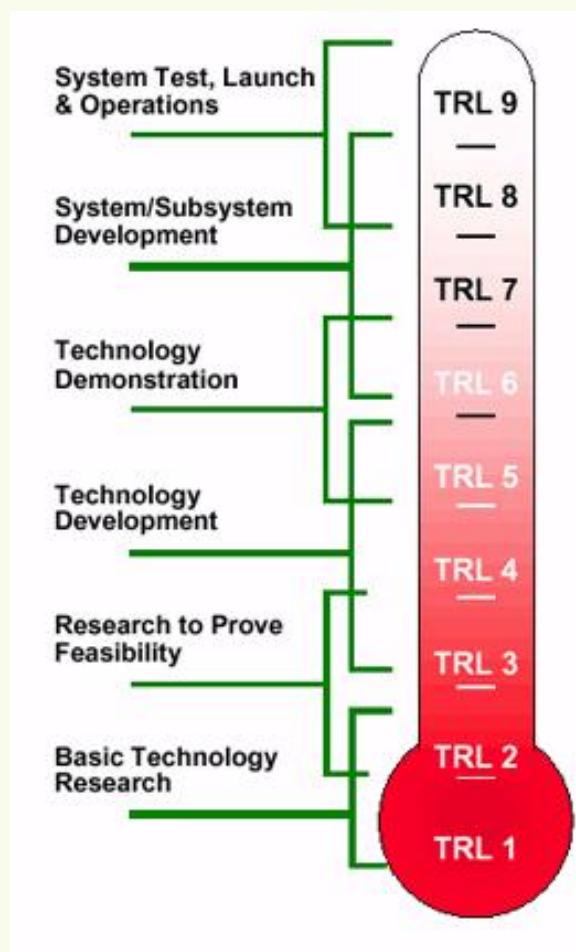
R&D Roadmap



A comprehensive R&D roadmap has been developed involving government, CSIR and Industry

This will be the subject of Navin's presentation

R&D and Industrialisation



- The R&D program should not be viewed as distinct from the industrialisation program.
- Presently a focus on localising and customising existing technologies through engaging with SA OEMs to innovate in an iterative manner (esp. in the modernisation program)
- As “mechanisation” technologies mature, they will be commercialised through partnerships with SA OEMs.

Procurement Leverage

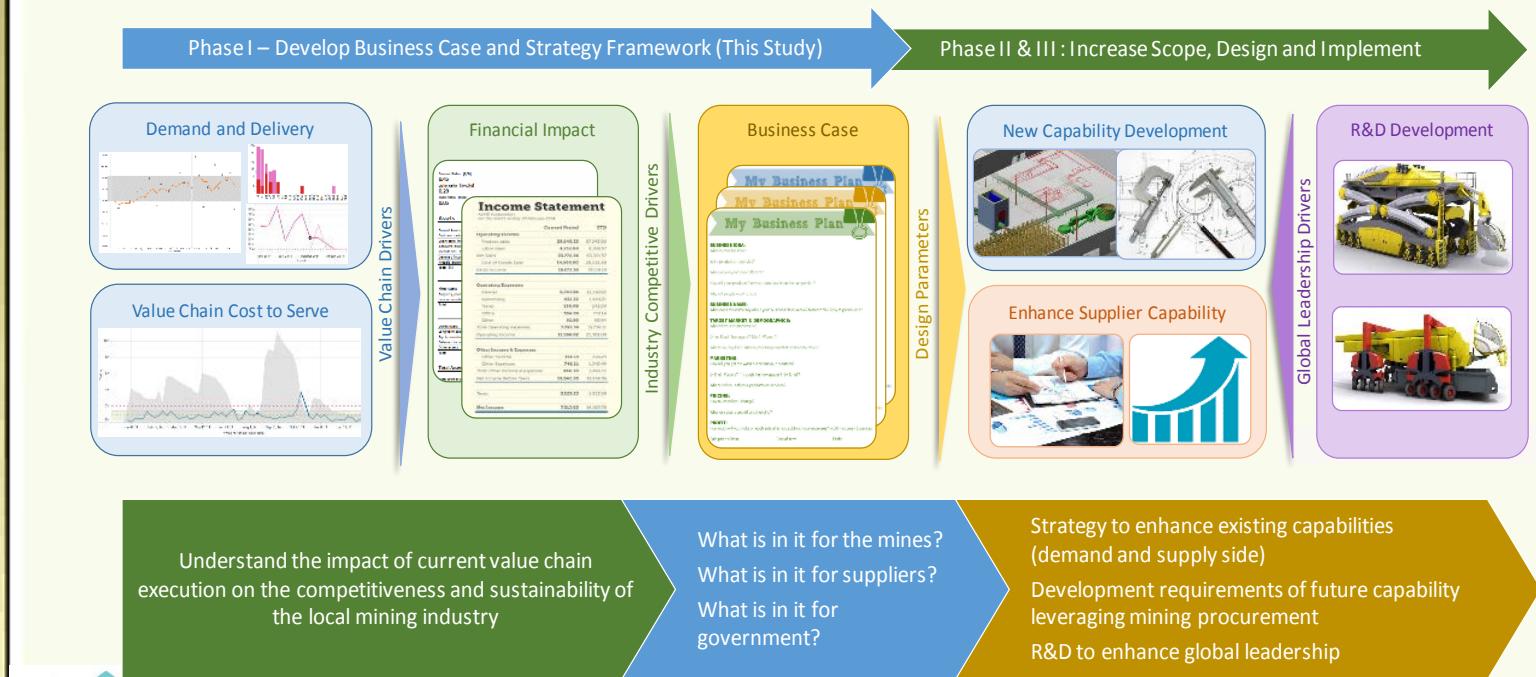


Procurement leverage in mining companies needs to achieve four objectives:

1. Provide support to grow small enterprises to a medium scale.
2. Create economic opportunities for entrepreneurs from communities surrounding the mine.
3. Drive transformation across all suppliers.
4. Develop and localise new technologies in South Africa.

Industrialisation

- With the decline or the rand and the commodity crisis, supplier development program seen as a strategic necessity by mining companies.
- The procurement spend of four mining companies is presently being analysed to develop a business case for supplier development and localisation from a mine company point of view.
- This will need to be followed by a more comprehensive analysis of the entire value chain to design specific interventions



Mining Supply Chain Capability

The challenge is that supply chain planning capability is extremely immature in the mining industry.

- There are no product naming, numbering and classification standards within the supply chain meaning that it is:
 - Difficult to aggregate expenditure on products and services.
- No digitalised communication between operations, inventory, procurement and suppliers – limited business integration
- Total cost of ownership performance monitoring largely absent.
- Strategic and tactical demand planning not existent – many ad-hoc procurements.

Urgently need to intervene to develop standards and provide training

Firm by firm process of re-engineering is required.

Steel value chain development

Objectives of Partnerships

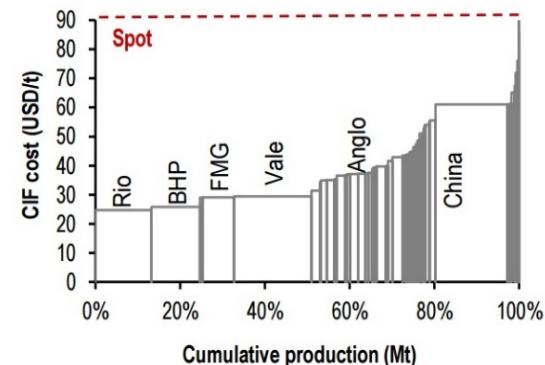
- Enabling of transparency of cost / pricing along the value chain
- **Co-ordinated productivity improvements along the entire supply chain.**
- Consolidation and planning of demand to enable scale and transformation along the value chain.
- Very specific developmental pricing for agreed for targeted localisation initiatives.
- Lowering costs of primary inputs to enhance the competitiveness of the value chain.

Win-Win Beneficiation: Iron and Steel

Iron and Steel R&D Forum

- SA needs to develop a high level of technological dynamism to differentiate iron and steel products from low cost iron ore producers.
- When Iscor was unbundled, the R&D capability was split up between the iron and steel value chains and without any coordinating institution – Forum trying to fill the void.
- Forum, in partnership with Mintek, is focused on R&D program to develop technologies to extend life of mine, utilise material previously deemed technically unsuitable as well as consider blending options of various Fe sources for downstream steelmaking.

Seaborne iron ore cost curve (2017e)



Source: Wood Mackenzie, HSBC estimates

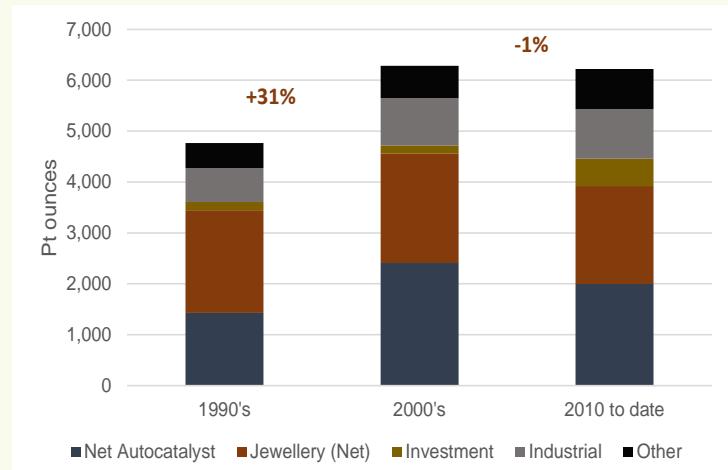
Iron Ore Mining Cost Curve

Win-Win Beneficiation: PGM

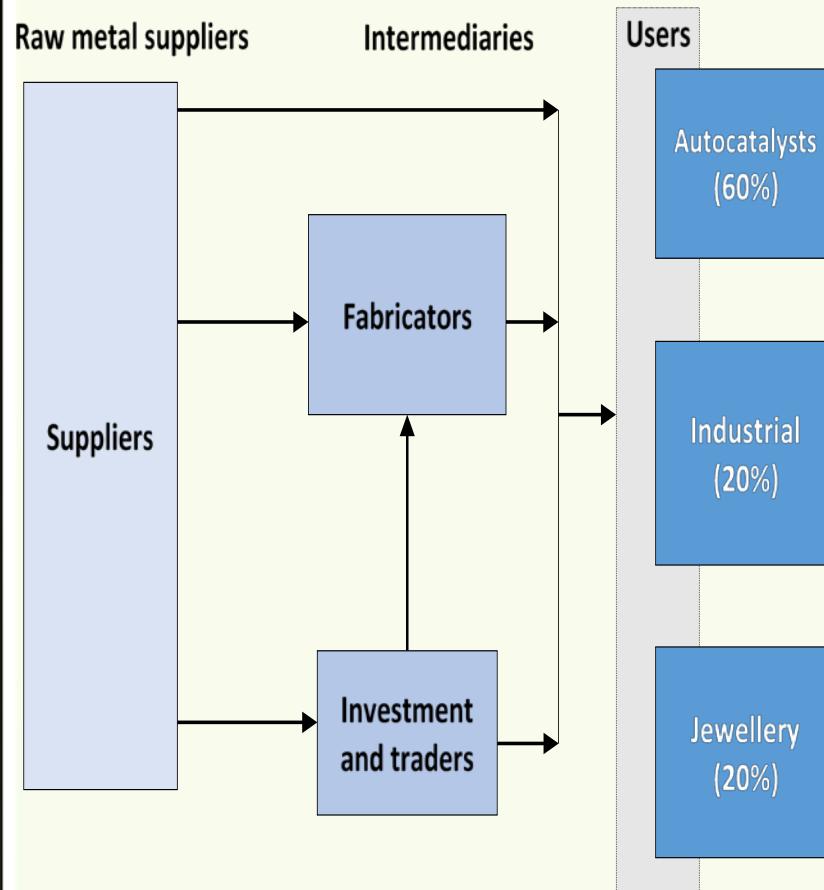
PGM Beneficiation

- PGMs are the most significant underground resource by value, whilst PGM miners are the largest employer and second largest exporter in the mining industry – the North West and Limpopo Provinces are particularly dependent on PGM mining for employment.
- Future PGM demand will be driven by technological and financial innovation - in the absence of such innovation, it is probable that demand for PGMs will progressively decrease as new technologies such as the electric vehicle develop.
- A comprehensive national project is required to turn PGMs into a symbol of “shared value”, national development and international collaboration.

Stagnant Platinum Demand Growth



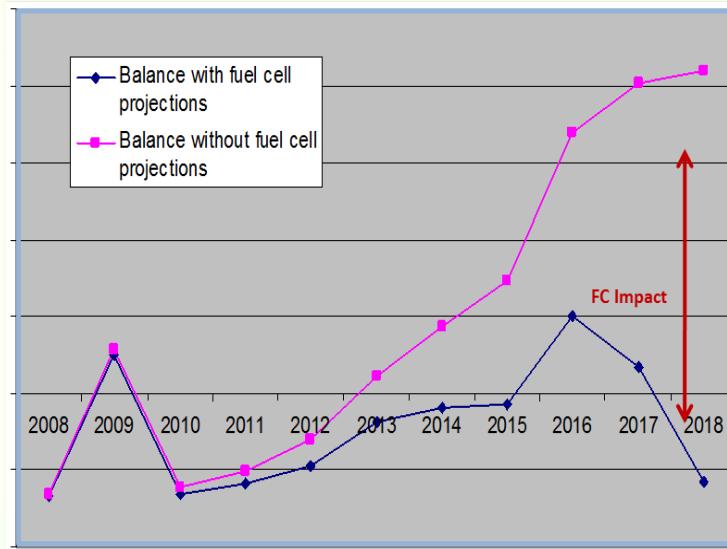
Win-Win Beneficiation: PGM



- Key initiatives relating to PGM beneficiation include:
 - Development of PGM roadmap coordinated by Mintek in partnership with industry to align industry and government R&D processes.
 - Establishment of gold and platinum jewellery manufacture export facility.
 - Partnership with global OEM around PGM technology centre of excellence.
 - Exploration around creating investment instruments.

Win-Win Beneficiation: PGM Fuel Cells

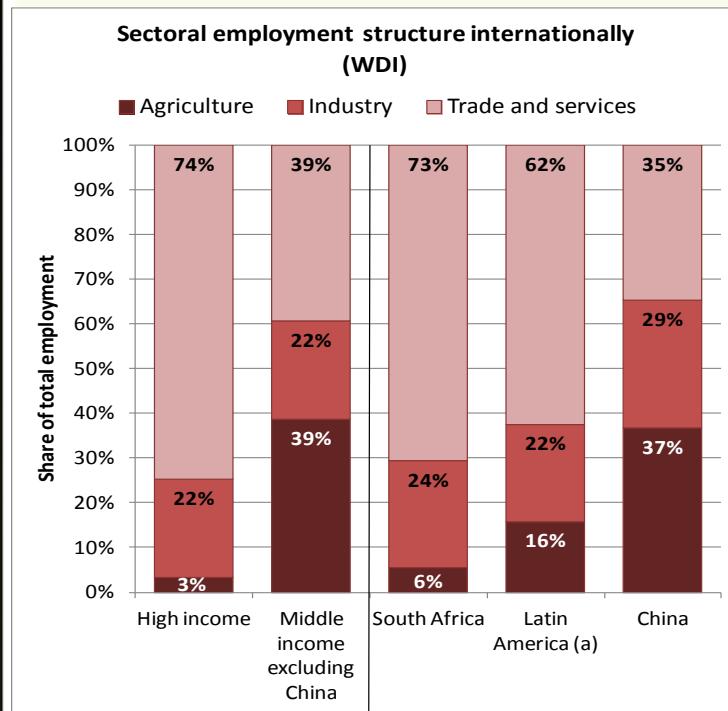
Platinum Gross Demand Forecasts: Supply demand balances



- Demand for fuel cells could be a game changer in terms of future demand for platinum.
- PGM mining companies are committed to supporting development of fuel cell industry in South Africa.
 - Mobile applications being developed with SA OEMs for underground and surface mining equipment.
 - Implats off-take combined with NCP and Ekurhuleni off-takes make business case for establishment of export orientated fuel cell and catalyst manufacturing facility in Ekurhuleni SEZ – need to expand to government buildings.

Agriculture

The development of agriculture needs to be seen as a core part of the national industrialisation process.

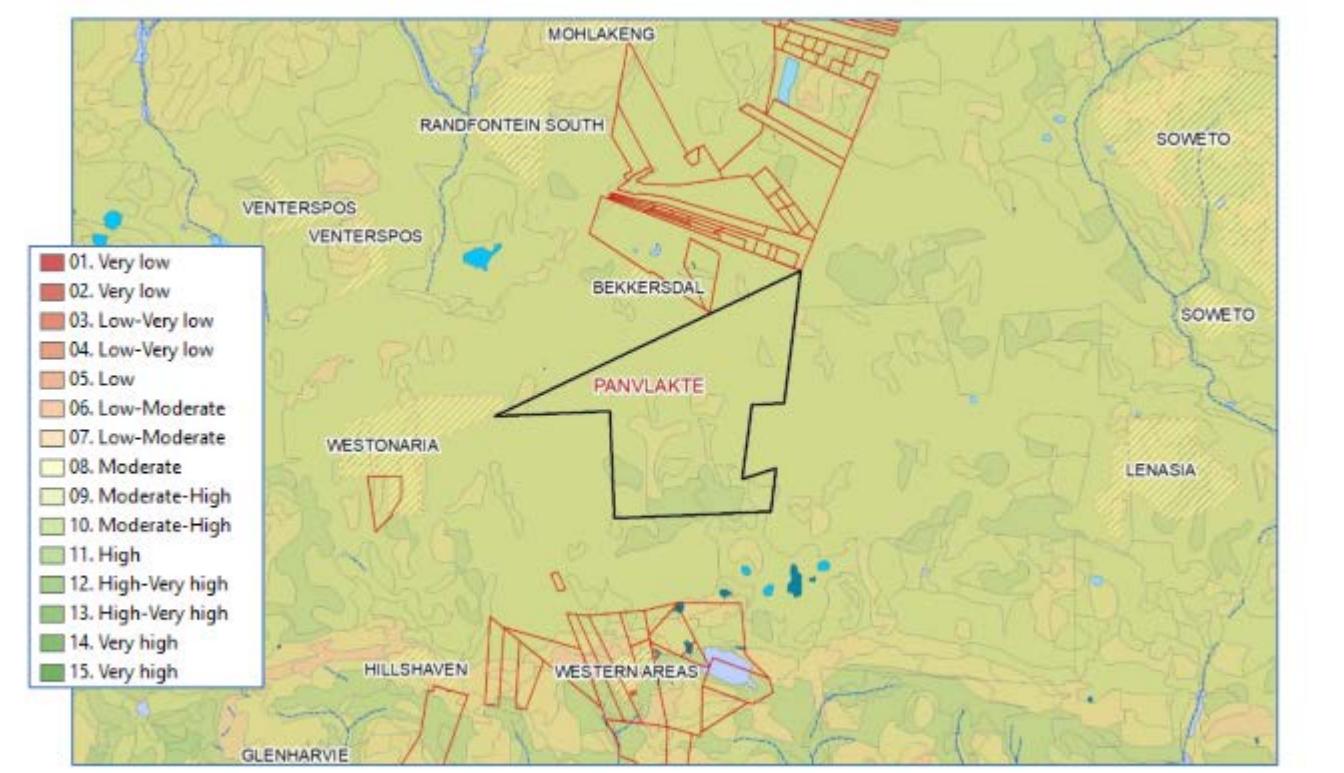


- Welfare impacts of stable wages for rural women are extraordinary.
- Agriculture has the potential to grow employment and increase exports.
- The development of agriculture is not a “development aid” challenge, but an industrial development challenge.
- South Africa has world leading agribusinesses with access to technologies, established export networks, understanding of local conditions and capital to invest – but need access to land...
- The Hub’s priority is to explore how large scale partnerships can be structured.



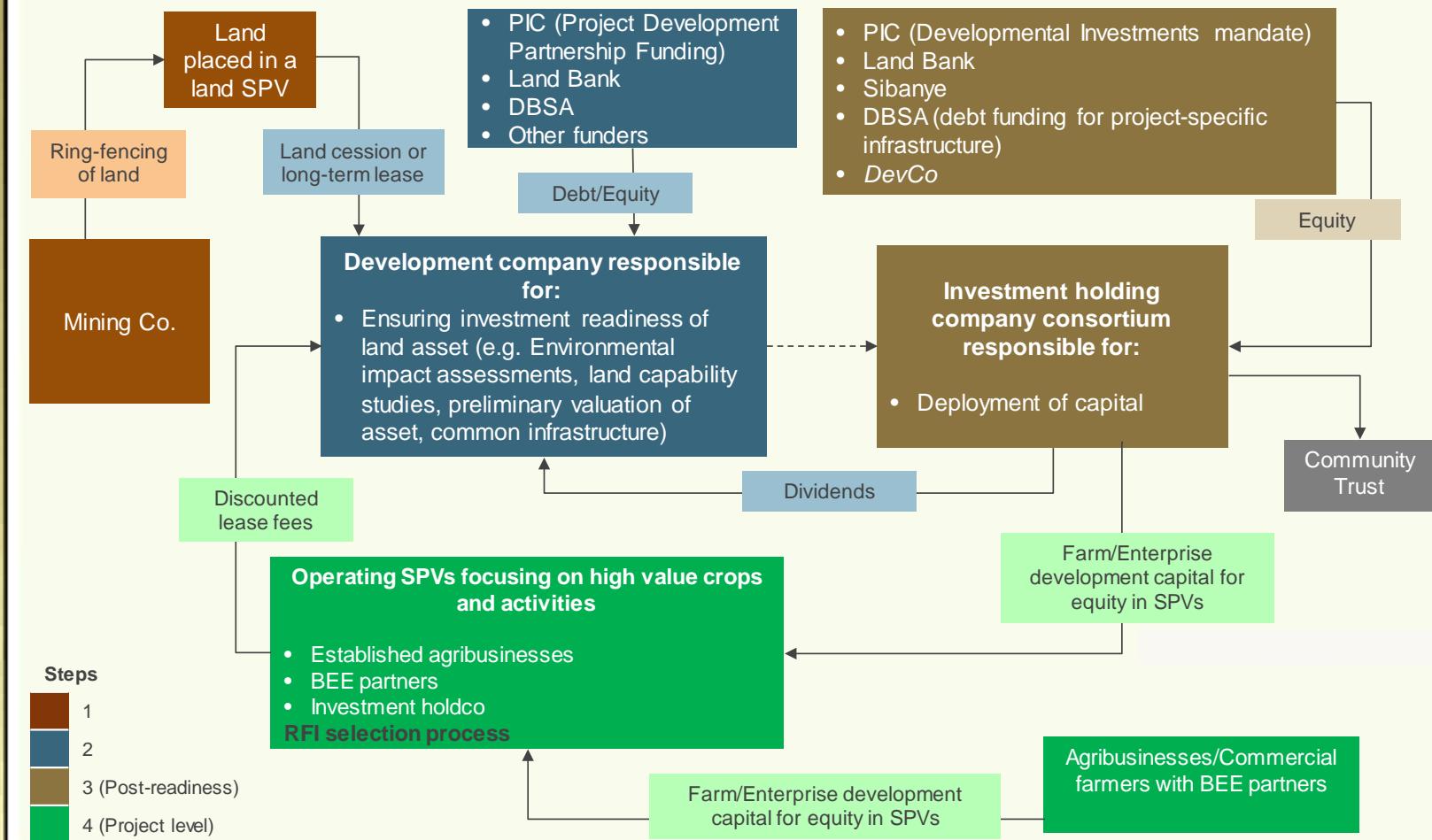
Rural Development

- An RFI for 15000 hectares of arable land designed by Sibanye for development in partnership the Land Bank, PIC, mainstream –banks and agribusiness.
- Two million litres of water per day also available.
- Objective is to promote job creation, export promotion, high value agriculture, community development and transformation.

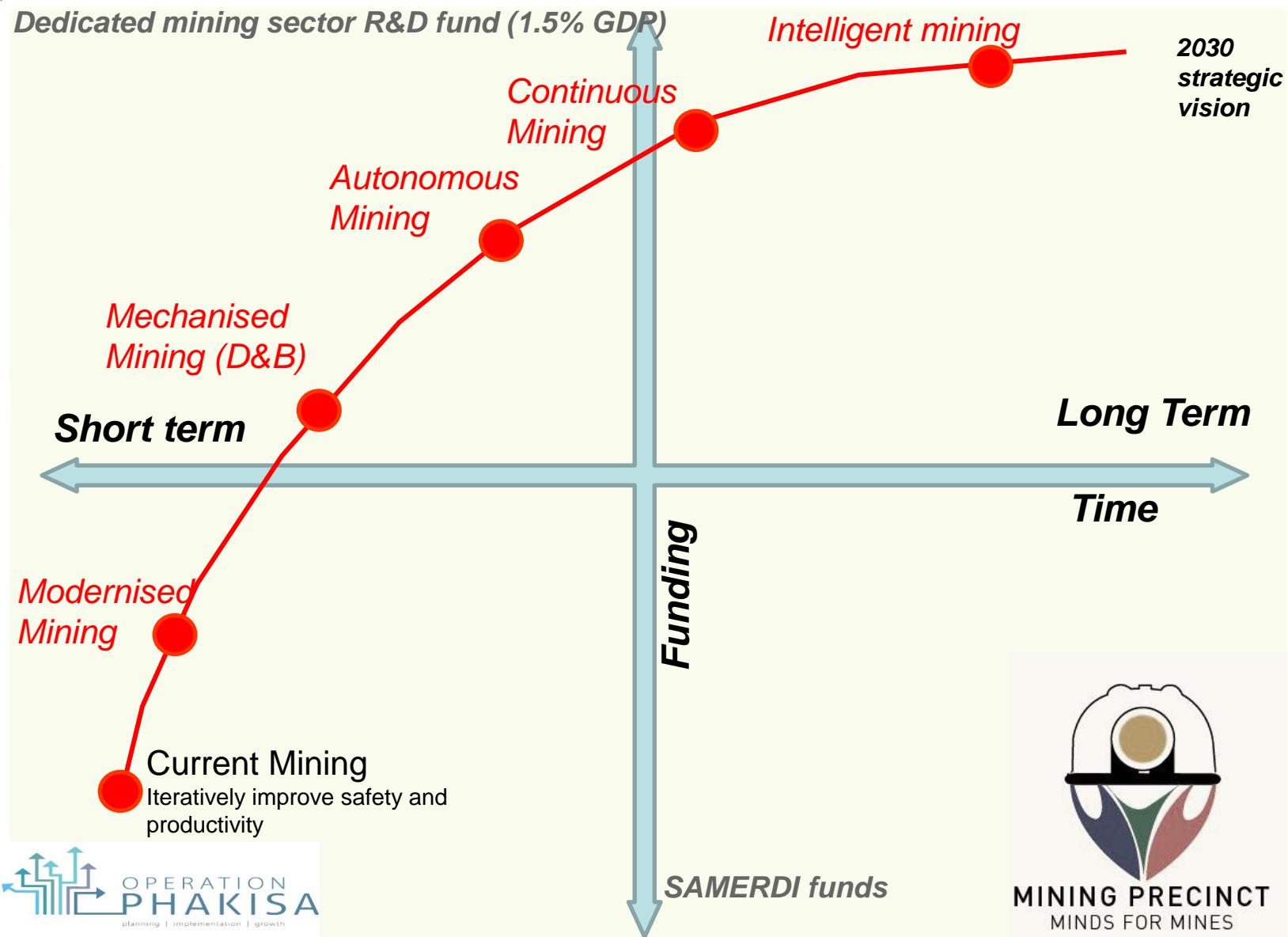


Rural Development

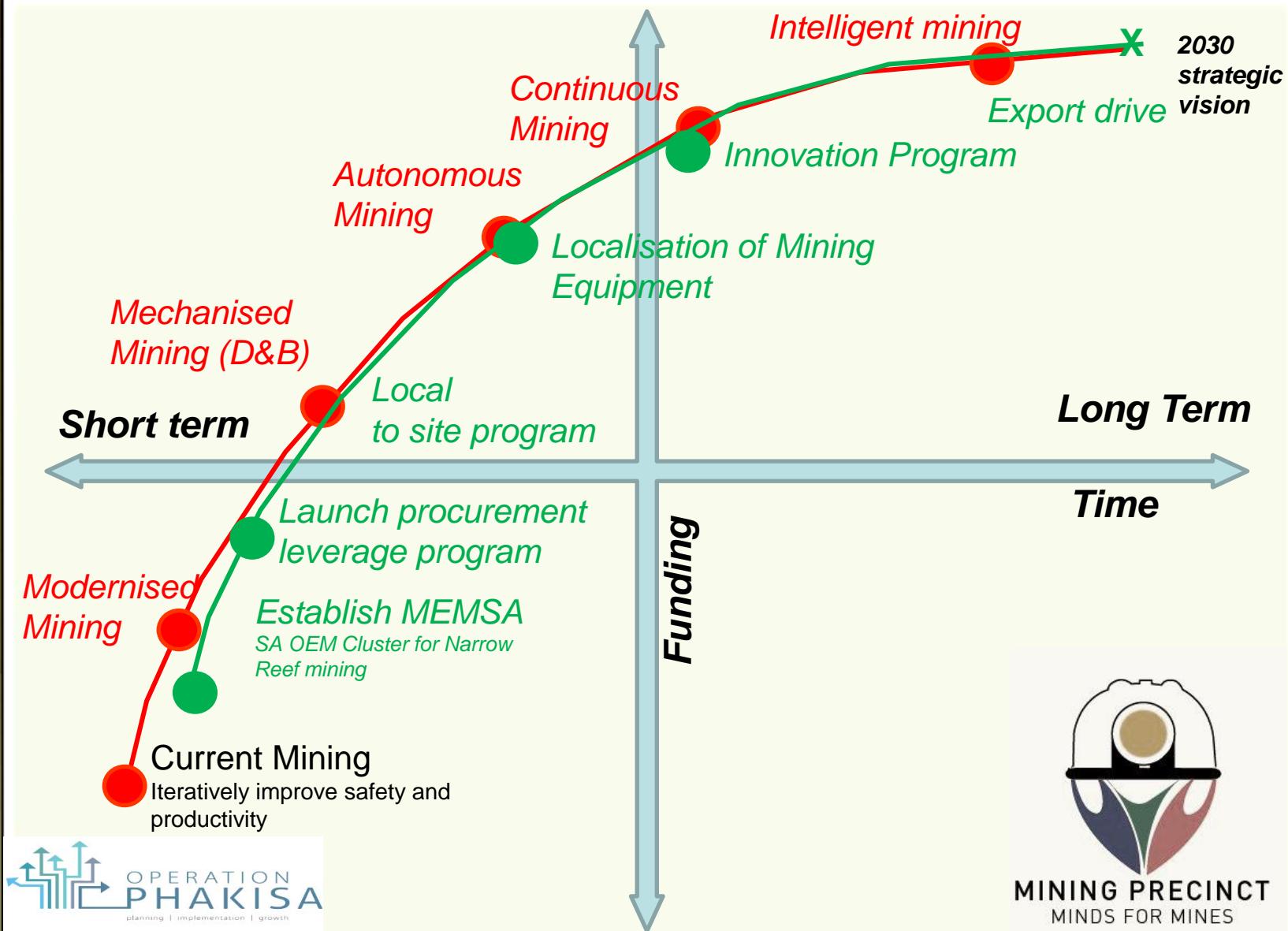
A systematic funding structure is being put in place.



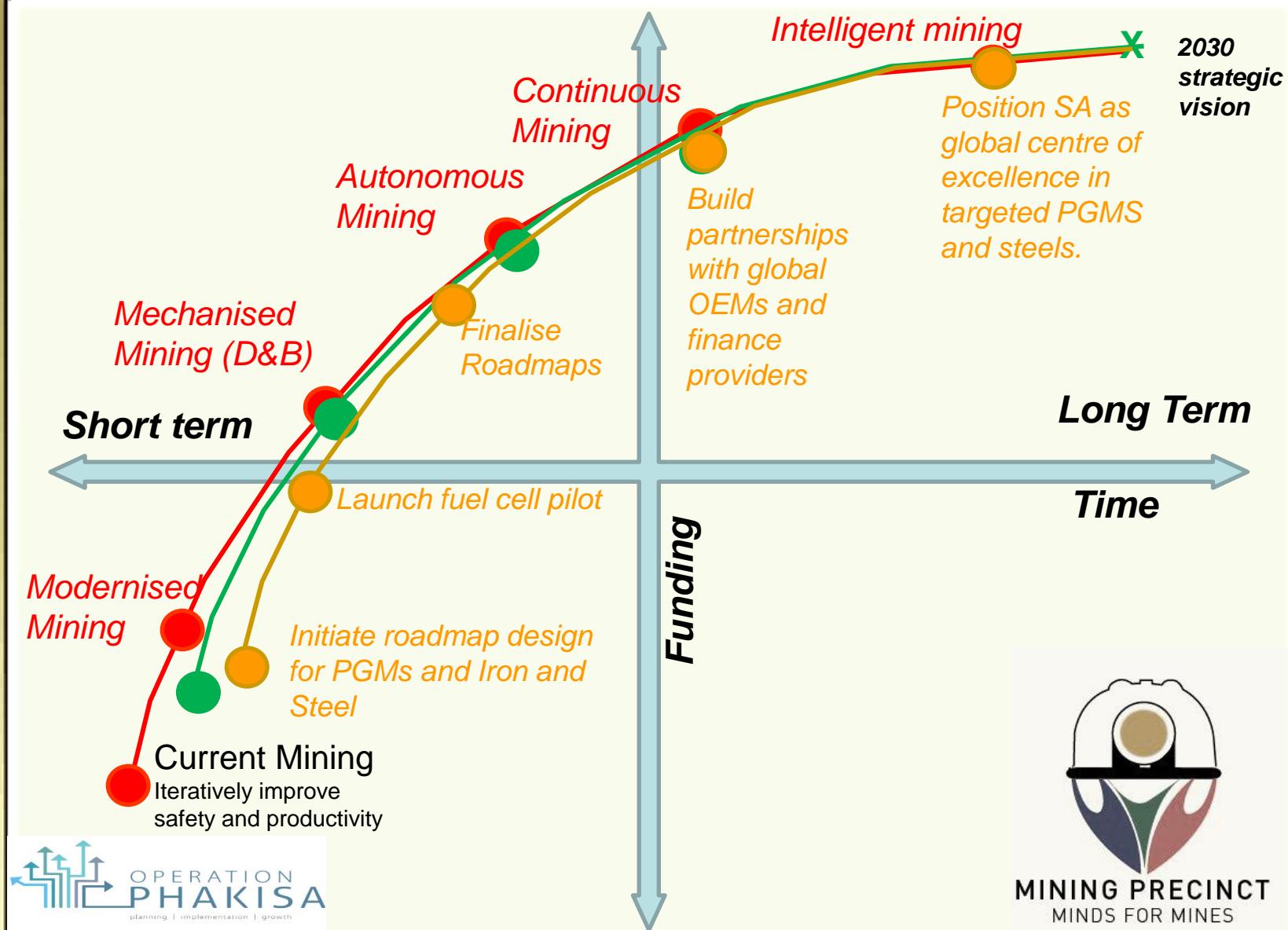
The Mining Industry Journey to 2030



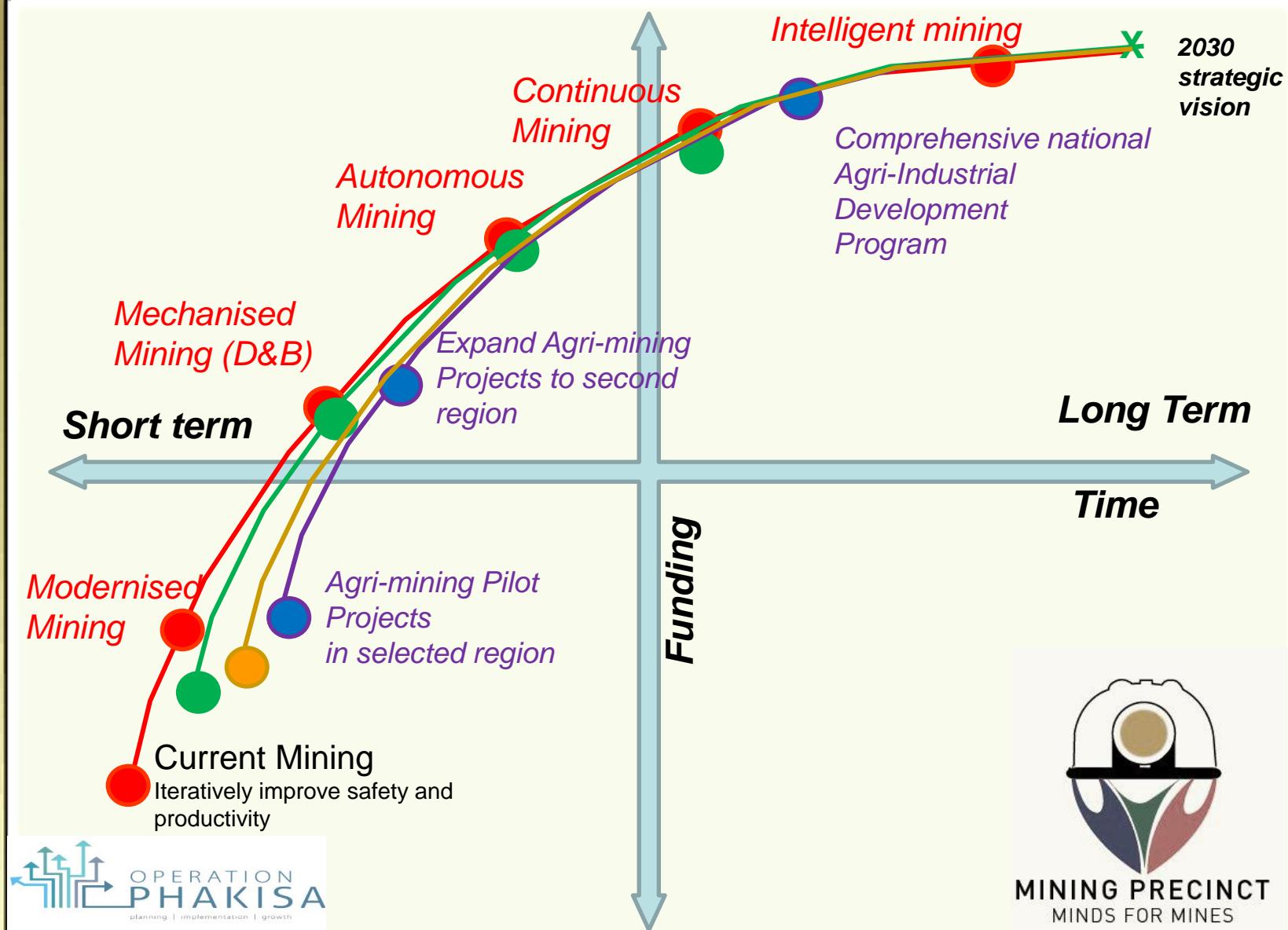
The Mining Industry Journey to 2030



The Mining Industry Journey to 2030



The Mining Industry Journey to 2030



Conclusions

- The Phakisa provides a platform for stakeholders to have a structured dialogue around how to respond to the immediate challenges facing the mining cluster and on how to build a competitive, sustainable and inclusive cluster for the future.
- The commitment of stakeholders to the process and the willingness to make concrete commitments to the strategic initiatives that have been developed illustrate the importance of building a culture of collaboration and partnership in the sector – this has serious policy implications.
- The technology interventions should not be viewed in isolation - the Precinct is driving integrated programs to ensure that the welfare of all stakeholders is advanced
- The action plan for the next period is designed to build developmental coalitions to build momentum and deliver concrete value relating to:
 - Mining system and technology research and development.
 - Development and enhancement of the national supply chain.
 - Beneficiation of targeted resources.
 - Rural and agri-industrial development

Thank You

