

Maximising South Africa's chrome ore
endowment to create jobs and drive sustainable

GROWTH



Under threat -

South Africa's mature chrome value chain which provides
over 200 000 jobs and contributes over R42 billion in GDP per annum

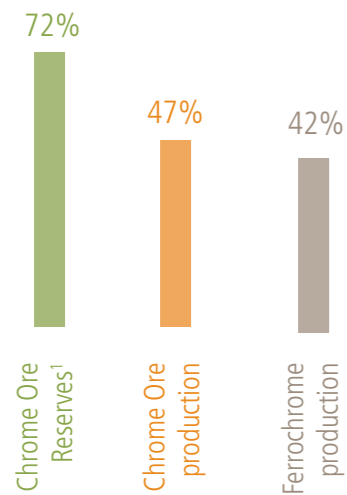
EXECUTIVE SUMMARY

South Africa has a mature chrome value chain, the socio-economic impact of which includes approximately 200,000 jobs and approximately R42 billion in GDP per annum. However, the South African ferrochrome industry, the baseline for beneficiation in the chrome value chain, is under threat and its rapidly declining market share is putting jobs at risk. At the same time, exports of unbeneficiated South African chrome ore to China are rising. These exports, which are providing chrome ore feedstock to the South African ferrochrome industry's chief competitor, China, are creating jobs in China and reducing job creation opportunities in South Africa's ferrochrome industry.

This paper examines the drivers of this trend and proposes a two-phased solution that will promote South African chrome ore beneficiation, create jobs and ensure profitable, sustainable growth for all industry players.

SOUTH AFRICA ALREADY HAS A MATURE CHROME BENEFICATION INDUSTRY

South Africa's share of world reserves and production in 2010



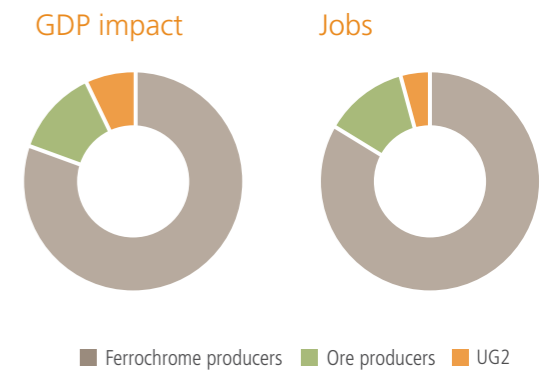
1. Excluding UG2 (with UG2, RSA would have 82% of world's chrome resources)

SOURCE: Roskill, ICDA, Company filings, Heinz-Pariser

- > **#1** chrome ore and ferrochrome producing country
- > **100%** of metallurgical grade chrome ore has, historically, been beneficiated locally
- > **4.8 MILLION TONNES** of ferrochrome capacity has been installed
- > **13 BILLION RANDS** invested in beneficiation capacity since 2006
- > **200 000** direct and indirect jobs have been created across the chrome value chain
- > **90%** of key inputs including technology and equipment are sourced locally
- > **20%** of mining related foreign exchange was earned from ferrochrome sales, comparable to the South African gold industry
- > **2nd** largest customer of ESKOM, paying approximately R5-6 Billion in tariffs (between 7-8% of ESKOM Revenue)

IN 2010, THE CHROME VALUE CHAIN CONTRIBUTED

- > GDP of R42 billion
- > Foreign exchange earnings of R36 billion



SINCE 2006, THE CHROME VALUE CHAIN

- > Paid taxes amounting to R2.5 billion per annum
- > Made investments amounting to R3.5 billion per annum

80% of value creation (including jobs) in the chrome value chain is created by Ferrochrome Producers

SOUTH AFRICA IS A LEADER IN FERROCHROME MANUFACTURING TECHNOLOGY BOASTING SUPERIOR EFFICIENCIES

South Africa has world-class ferrochrome manufacturing facilities that boast state-of-the-art technology creating better energy efficiency, yields, and reductant usage, mostly within large, closed furnaces that optimise productivity and minimise the industry's CO₂ footprint.



Global benchmarking of manufacturing technologies

Furnace Type	Furnace Size (MVA)	Power Consumption (MW/t)
Closed	South Africa (43)	3.68
	South Africa (38)	3.73
	Kazakhstan (33)	3.78
Semi-Closed	28	3.83
	Kazakhstan (23)	3.88
	India (18)	3.93
Open	13	3.98
	India (8)	4.03
	China (8)	4.08

KEY HIGHLIGHTS OF SOUTH AFRICAN INDUSTRY INNOVATION AND INVESTMENT INCLUDE:

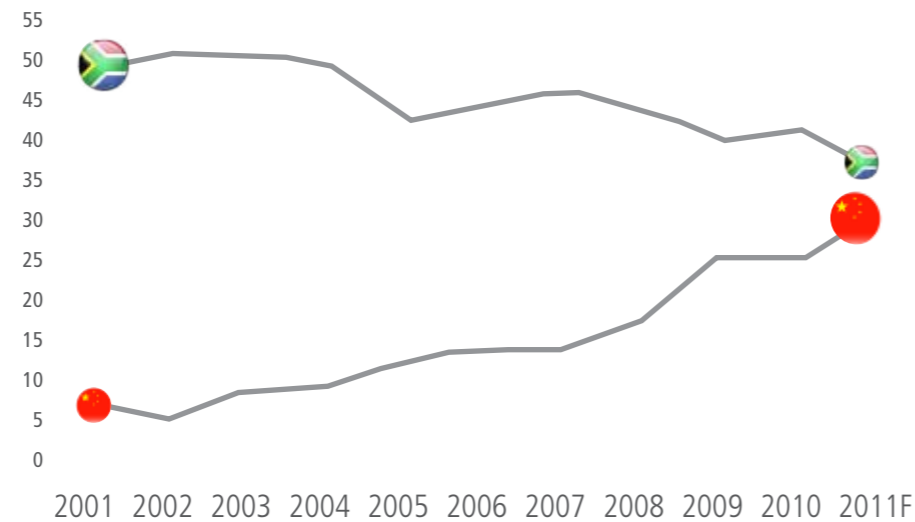
- > Innovated technologically and migrated toward closed furnaces, increasing energy efficiency and reducing CO₂ emissions
- > Pioneered use of UG2 concentrate recovered from platinum industry tailings thereby contributing to optimising South Africa's chrome resources
- > Became less reliant on imported metallurgical coke imports through the use of locally produced anthracite and char
- > Investing in captive power generation and co-generation

THE PROBLEM THAT COULD PUT THE INDUSTRY OUT OF BUSINESS

THE SOUTH AFRICAN FERROCHROME INDUSTRY IS LOSING MARKET SHARE TO CHINA DESPITE SIGNIFICANT INVESTMENT IN EXPANDING LOCAL BENEFICIATION CAPACITY

- > South African ferrochrome industry has increased capacity by 39% since 2005 but is operating at sub-optimal capacity utilisation levels
- > 2010 capacity utilisation was 74% vs 90% in 2004
- > South Africa has dropped from approximately 50% to approximately 42% of ferrochrome market share between 2001-2010, whereas China has grown from approximately 5% to approximately 25% over the same period
- > This trend is accelerating as in 2011, South Africa is likely to have approximately 36% market share against China's 30% ferrochrome market share.

HC Ferrochrome market share evolution

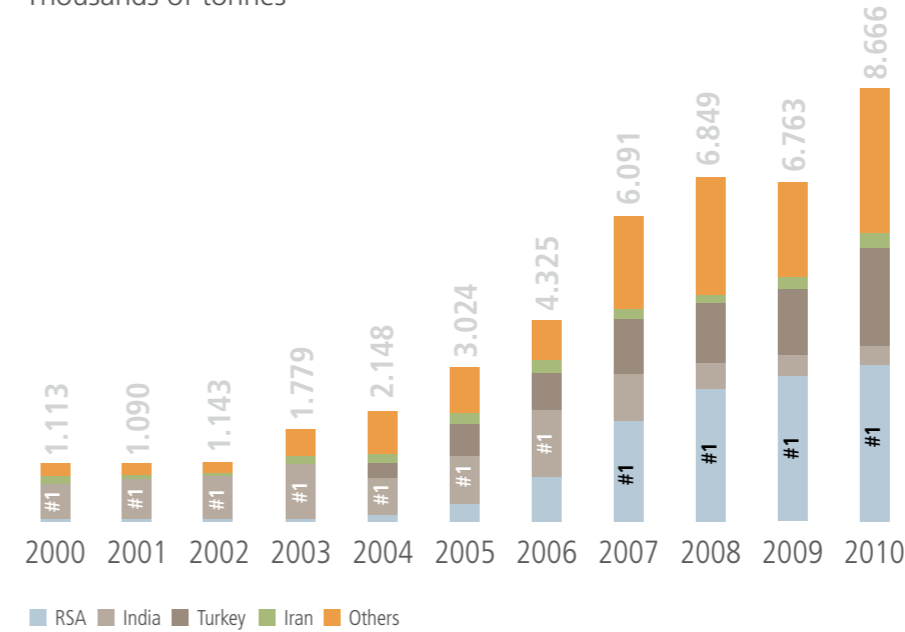


SOURCE: CRU, ICDA, Heinz Pariser, Industry estimates



CHINA'S ASCENDANCE IN THE FERROCHROME INDUSTRY IS LARGELY ENABLED BY UNBENEFICIATED CHROME ORE EXPORTS FROM SOUTH AFRICA

Chinese chrome ore imports by source
Thousands of tonnes

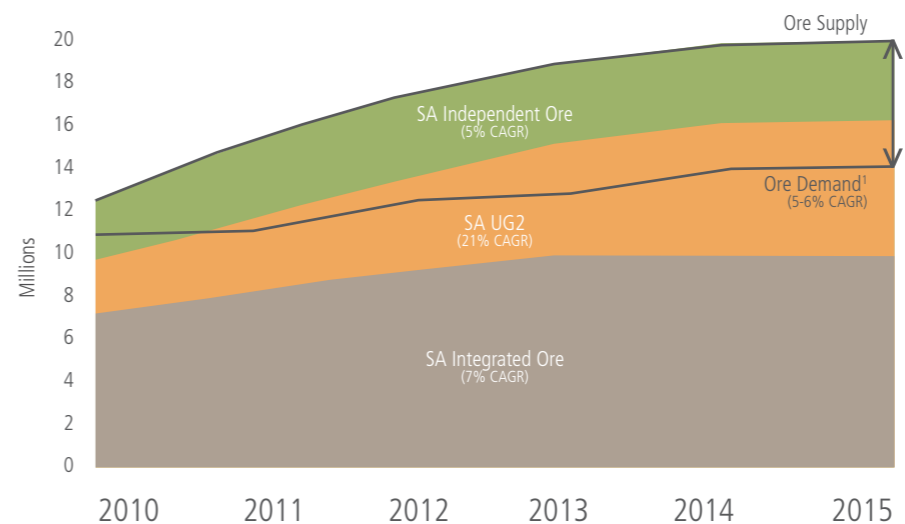


South Africa is now the number one exporter of chrome ore to China. India was once the leading exporter of ore to China but its exports started dropping in 2007 when the government intervened to promote local beneficiation.

SOUTH AFRICAN ORE SUPPLY GROWTH EXPECTED TO PUSH MARKET INTO OVERSUPPLY LEADING TO LOWER ORE PRICES AND LOWER FERROCHROME MARGINS

If South Africa's market share of the seaborne market remains at 2010 levels (36%), there will be a projected oversupply of some 5.5 - 6.0 million tonnes of metallurgical grade ore per year by 2014, leading to lower ore prices and consequently lower ferrochrome margins, with negative implications across the South African chrome value chain.

Projected chrome ore supply/demand balance
Millions of tonnes



1. Ore demand assumes total SA metallurgical ore demand and assumes SA maintains a 36% market share in the global ore market

SOURCE: Industry analysis

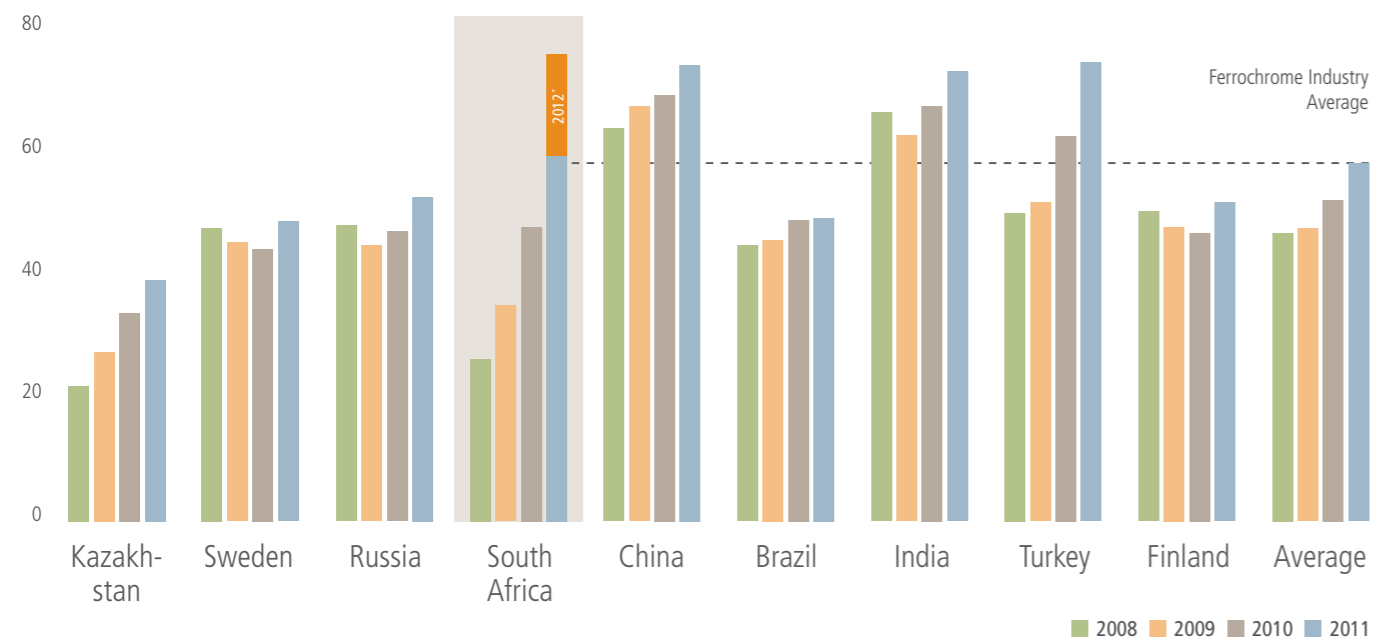
This graph illustrates that South African ore supply is expected to grow at a compound annual growth rate (CAGR) of approximately 10% from 2010-2015 vs global industry demand growth of approximately 5-6%. This extraordinary growth in ore supply is primarily driven by the proliferation of chrome recovery from UG2 tailings in the platinum industry, approximately 21% per annum growth forecast from 2010-2015. This situation will become even more acute as the platinum industry continues to switch from mining the Merensky reef to chrome-bearing UG2 reefs.

EROSION OF SOUTH AFRICAN PRODUCERS MARGIN EXACERBATED BY RAMPANT INCREASES IN COST BASE

Despite world class technology, beneficiation in South Africa is under threat

- > Ferrochrome production costs have risen rapidly, particularly since 2007 (approximately 11% per annum) due to escalating unit costs outside industry control
 - The most significant is electricity prices that have more than doubled since 2007 (by 2011, electricity costs represent approximately 22% of total production costs)
 - Labour costs have increased by between 8-10% per annum since 2007, in line with the overall increase in labour costs in the South African metals and mining industry, significantly outpacing finished goods price inflation
 - Metallurgical coke import costs have increased approximately 8% per annum since 2007 (approximately 15% per annum from 2005-2010) due to the impact of Chinese export tariffs on global prices
- > Additional cost pressures forecast have potential to render SA ferrochrome industry uncompetitive:
 - The proposed carbon tax is expected to add approximately 7.2 US c/lb of chrome content, which is equivalent to 34% of today's electricity costs. The proposed carbon tax would have key implications on SA ferrochrome cost competitiveness as most ferrochrome producing countries are unlikely to implement CO₂ taxes at the same level or with the same speed as South Africa.
 - The Integrated Resource Plan (IRP) 2010 envisages electricity price escalations of 15-25% per annum, over the next several years. The graph below benchmarks electricity costs for ferrochrome producers globally, illustrating that South African electricity prices are already high.

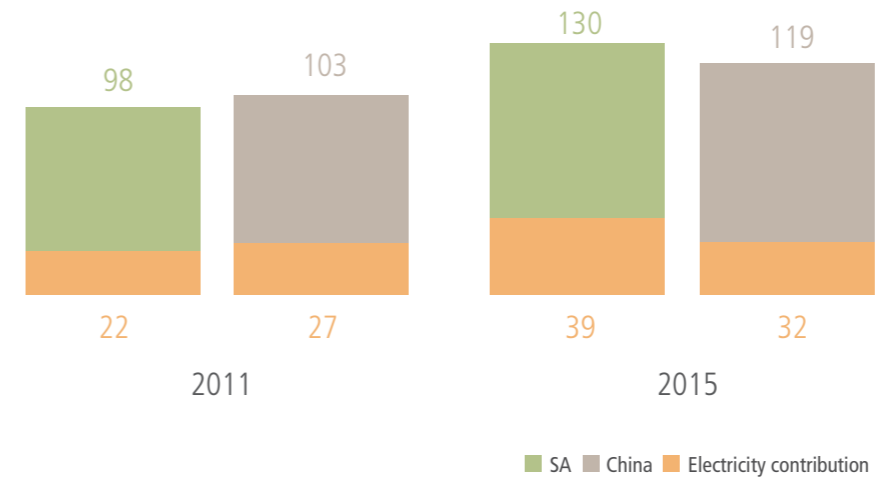
Average electricity rates for selected ferrochrome producing countries, US\$/MWh



NOTE: Etikrom used to receive a 40% discount from official tariff -the arrangement is believed to have come to an end.
 *SA power escalation for 2012 represents a real increase of 28% (based on 33% nominal increase as requested for by Eskom and assuming 5% CPI)

SOURCE: CRU

South Africa vs Chinese production costs Ferrochrome production costs (CIF China) US¹ c/lb Cr



1. Exchange rates held constant at 2011 levels

This graph shows South Africa is almost at parity with Chinese production costs today and is forecast to be **uncompetitive relative to China by 2012-2013** (higher cost).

If these trends continue unabated, South Africa could suffer significant losses



> Potential loss of between **60,000-80,000** South African jobs in domestic ferrochrome smelters



> Contraction of GDP by over approximately **R23 billion** (over 50% of today's chrome ore value chain contribution would be lost as smelters close)



> Collapse of prices in the chrome ore market as ferrochrome producers produce less ferrochrome and therefore supply supply ore into an already oversupplied market



> Increase in South African residential electricity prices due to loss of Eskom revenue



> Increase in global CO₂ emissions from ferrochrome production by at least **15%** per tonne as a result of a displacement of ferrochrome capacity from South African smelters to less energy- efficient Chinese smelters



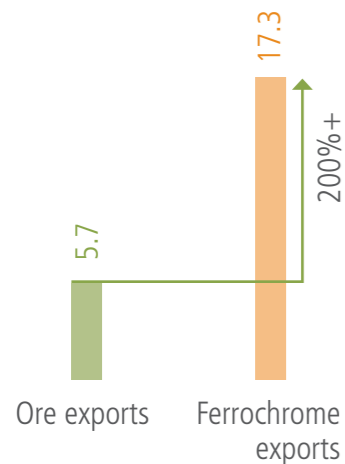
RECOMMENDED SOLUTION

TO MAXIMIZE ITS RESOURCE ENDOWMENT, SOUTH AFRICA'S BENEFICIATION STRATEGY MUST ENTAIL SOLUTIONS THAT WOULD ACCOMPLISH TWO KEY OBJECTIVES:

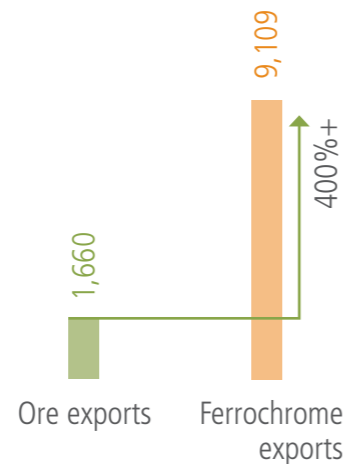
- > **Foster a competitive environment for beneficiation:**
 - Maximise utilisation of existing ferrochrome capacity and then,
 - Expand ferrochrome capacity in line with SA's world-leading resource endowment
- > **Compliment our beneficiation strategy by creating sustainable, long term returns from chrome ore exports**
 - Extending the life of South African reserves through good resource management
 - Ensuring sustainable supply/demand balance in the market to improve price stability to support continued investment in industry

Beneficiation impact on GDP and employment

Jobs created per '000 tonnes of ore



ZAR/tonne of GDP impact per tonnes ore



> South Africa's beneficiation strategy is justified. The country should aim to increase production of ferrochrome with its significant potential to yield large socio-economic benefits for South Africa, as opposed to exports of unbeneficiated ore. The graph on the left provides ample evidence to support the justification for expanding beneficiation.

Action should be taken to improve South African cost competitiveness:

- > Agree and communicate justifiable electricity price path that would promote power sector investment while maintaining South African industrial competitiveness
- > Align CO₂ tax implementation with global ferrochrome industry to prevent South Africa from being at a competitive disadvantage relative to competitors due to legislative intervention

South Africa would not be alone in implementing measures to maximise returns from its resource endowment.

- > Many countries across commodities have instituted and/or encouraged practices to improve industry structure and/or drive beneficiation to maximise domestic economic impact, e.g., Canada: potash; India: chrome ore/iron ore; China: metallurgical coke; Brazil: iron ore
- > Whilst India has already introduced policy to reduce unbeneficiated chrome ore exports, other key chrome ore exporting countries (Oman and Turkey) are exploring similar interventions.

INDUSTRY RECOMMENDS A TWO-PHASED SOLUTION TO MAXIMISE SUSTAINABLE, LONG-TERM RETURNS FOR SOUTH AFRICA FROM ITS CHROME ORE ENDOWMENT:

First, South Africa should implement an export tariff of 100 USD/tonne of chrome ore to raise level of domestic beneficiation in line with South Africa's beneficiation strategy

- > India has been successful at curbing ore exports and boosting domestic ferrochrome production by introducing similar measures
- > Government revenue from the export tariff could be ring-fenced to promote socio-economic development within communities tied to the chrome industry and/or investment in enablers such as power.

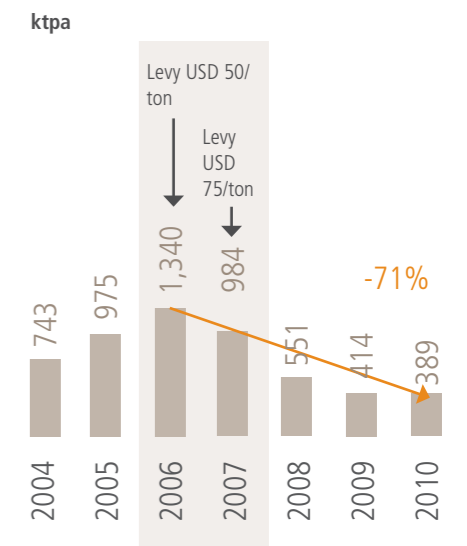
Secondly, South Africa should support development of an industry chrome ore marketing arm which will allow the country to optimise its chrome resource management while supporting sustainable, profitable growth for all industry stakeholders. It would be designed around several key principles related to resource management and driving local beneficiation:

- > Mandatory participation by all SA chrome ore miners and by-product producers
- > Solution designed to maximise long-term sustainable growth for all industry players, while also creating space for new entrants to capture future industry growth
- > Self-regulating mechanism that would dynamically optimise South African ore exports while ensuring a fair and competitive domestic market

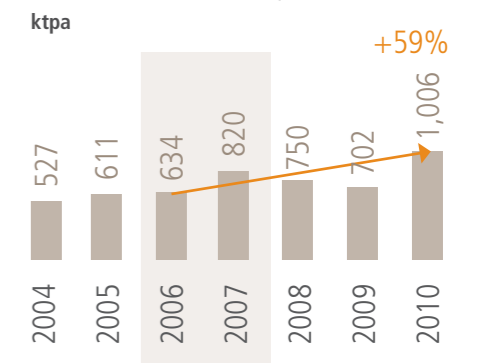


Impact of Indian Regulation Actions

Indian chrome ore exports



Indian ferrochrome production



SOURCE: Indian Gov. 't Reports

Canadian potash industry provides excellent case study of a successful marketing arm that has promoted sustainable, profitable growth for almost 40 years:

- > Canadian government faced rapidly rising supply 40 years ago that would flood market leading to long-term price depression. The Canadian government approved creation of a marketing arm created by its potash producers. For almost 40 years CanPotex, as it is now called, has led to sustainable long-term value for Canadian producers and a stable global market.
- > South Africa faces a similar situation where forecast supply growth (triggered by innovation and use of UG2 by-products in ferrochrome) will outpace demand growth. Accordingly, optimising the benefit to South Africa from its chrome endowment could be accomplished through bringing stability to the ore export market through a marketing arm similar to CanPotex in Canada.

Finally, South Africa would benefit from a thorough review of its forecast supply/demand balance to optimise resource management

- > Review ramp-up of UG2 chrome ore created as a by-product, in addition to large-scale expansion plans already under way by independent and integrated producers
- > Make considered decisions on the issue of new licences and support changes to mining plans to enable long-term resource sustainability, in line with forecast supply/demand balance

	Ore Price	Ferrochrome Price	SA Ferrochrome Market Share	SA Chrome Ore Market Share	Jobs	Forex
Status Quo	↓	↓	↓	↗	↓	↓
With Export Duty	↗	↗	↗	↗	↗	↗
Chrome Industry Marketing Arm	↑	↑	↑	↗	↑	↑

