

Mintek Strategic Plan 2014/15

Presentation to the

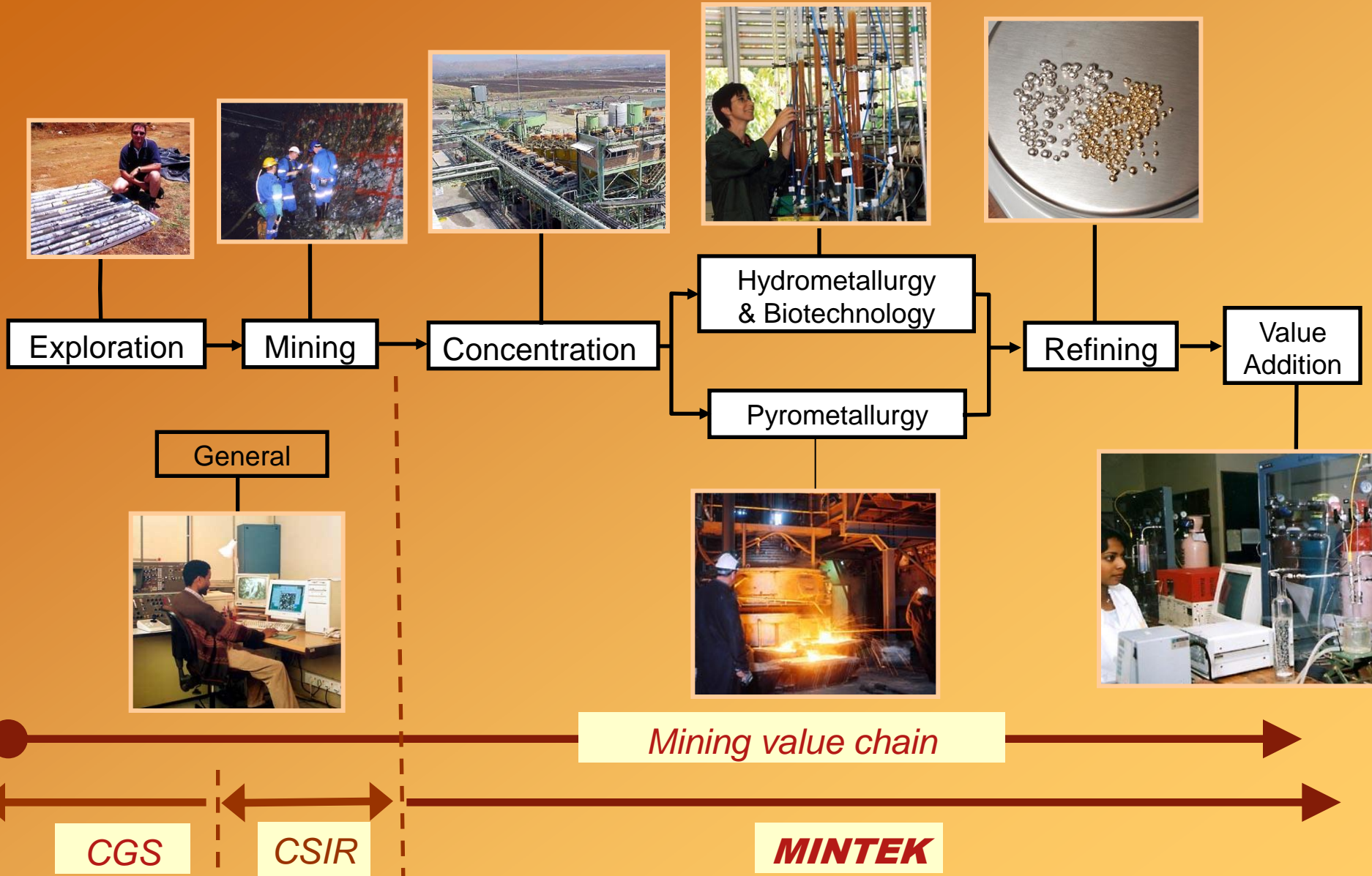
Parliamentary Portfolio Committee

02 July 2014





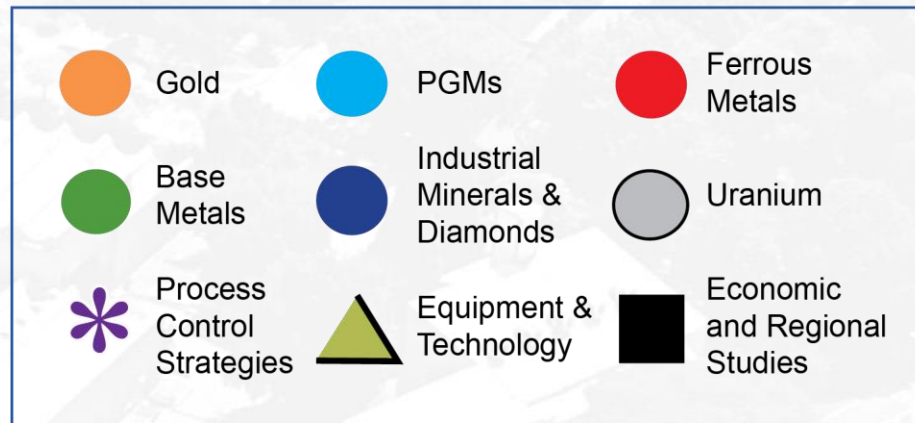
Mining Value Chain



The Business of Mintek

- CORE BUSINESS
 - R&D of efficient mineral processing technologies & value added products & services
 - Promotion of mineral based economies
 - Build world class R&D excellence
- OTHER
 - Uphold good governance practices
 - Enhancing Mintek's visibility and credibility

Our Global Activities



Strategy : *Focus is always on finding creative solutions for challenges*

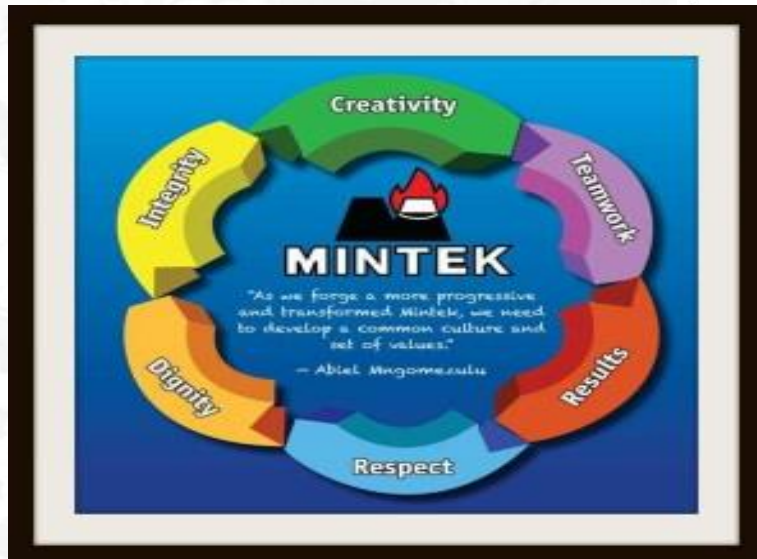
Visiting plants and “competing” facilities to identify services and “catch work”.



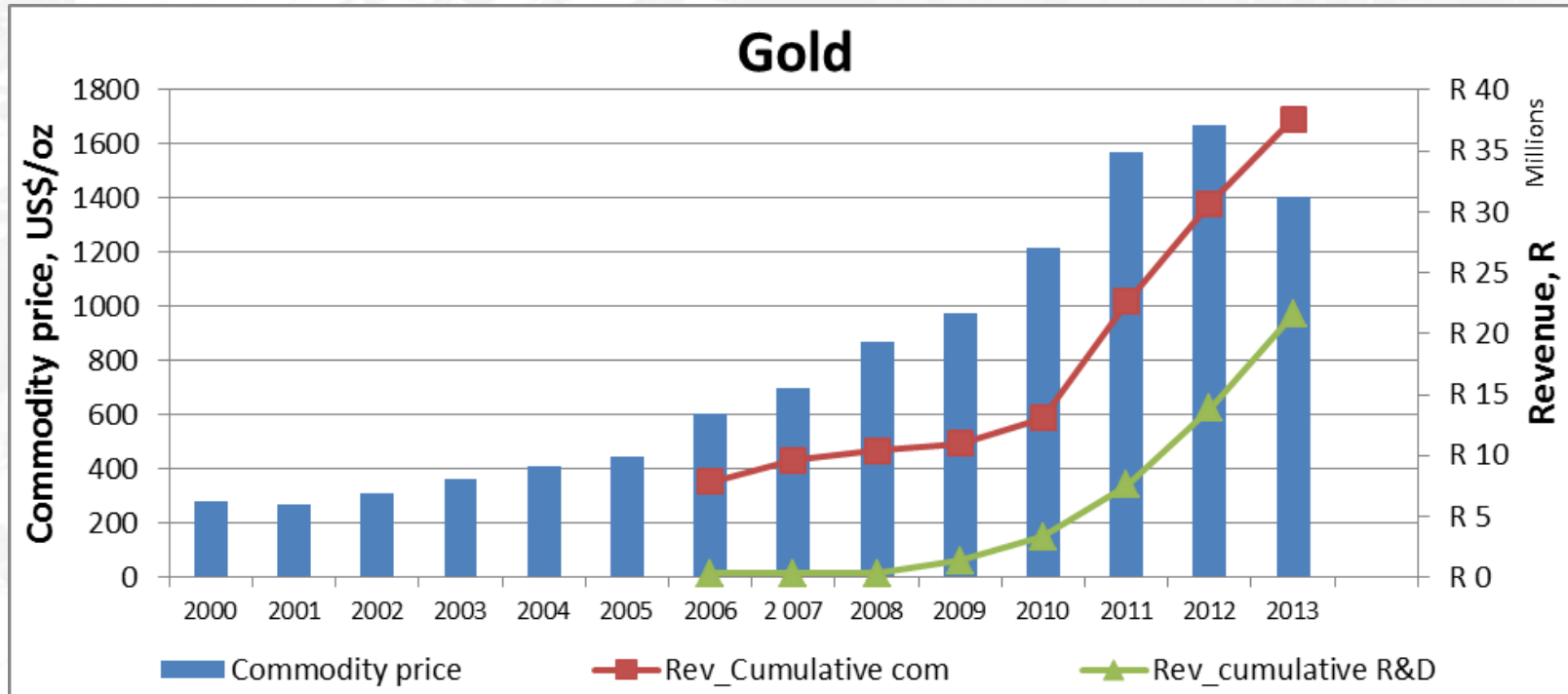
**“Think left and think right
and think low and think high.
Oh, the thinks you can think up
if only you try!”**

- Dr. Seuss

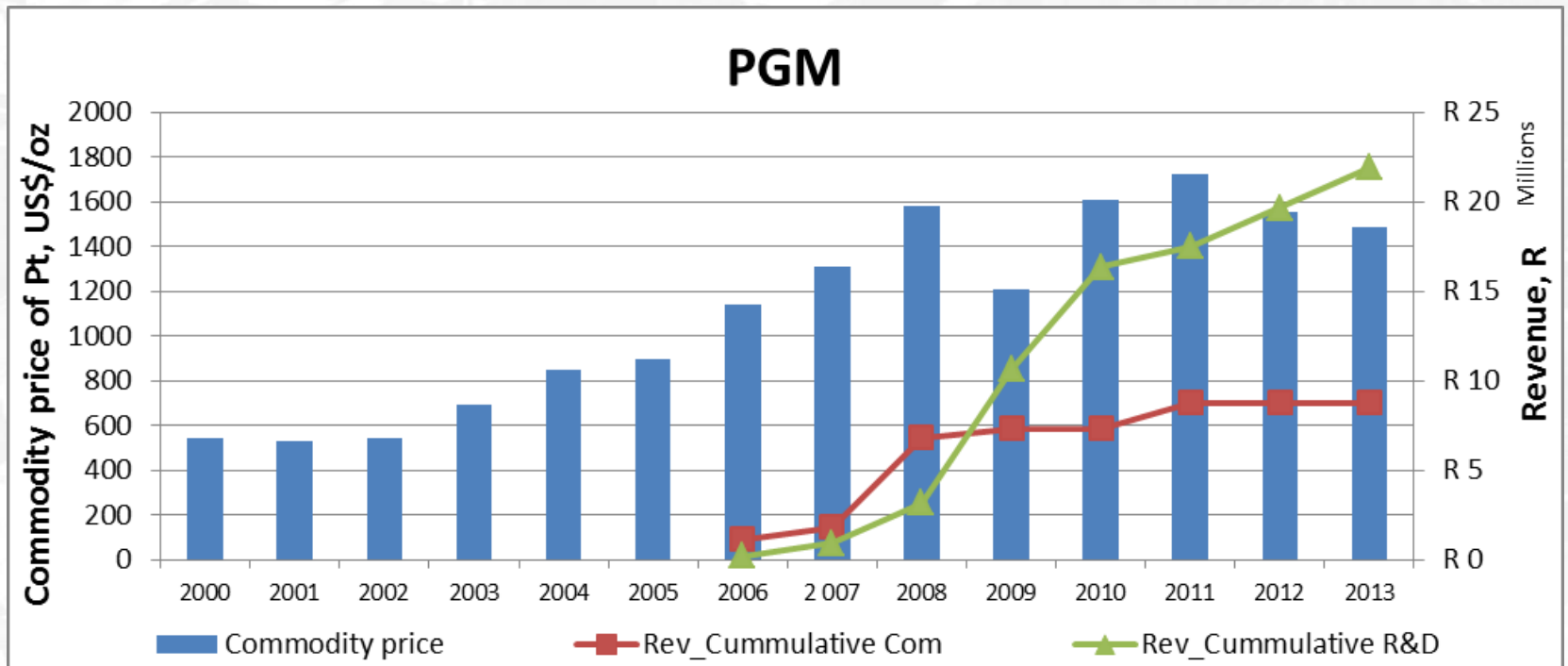
TwistedSifter.com



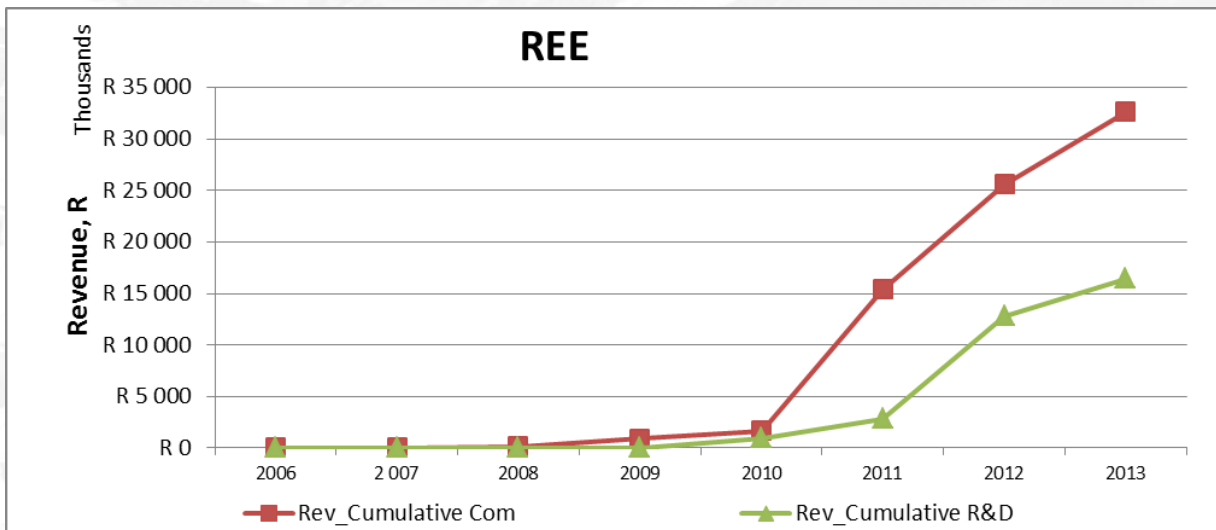
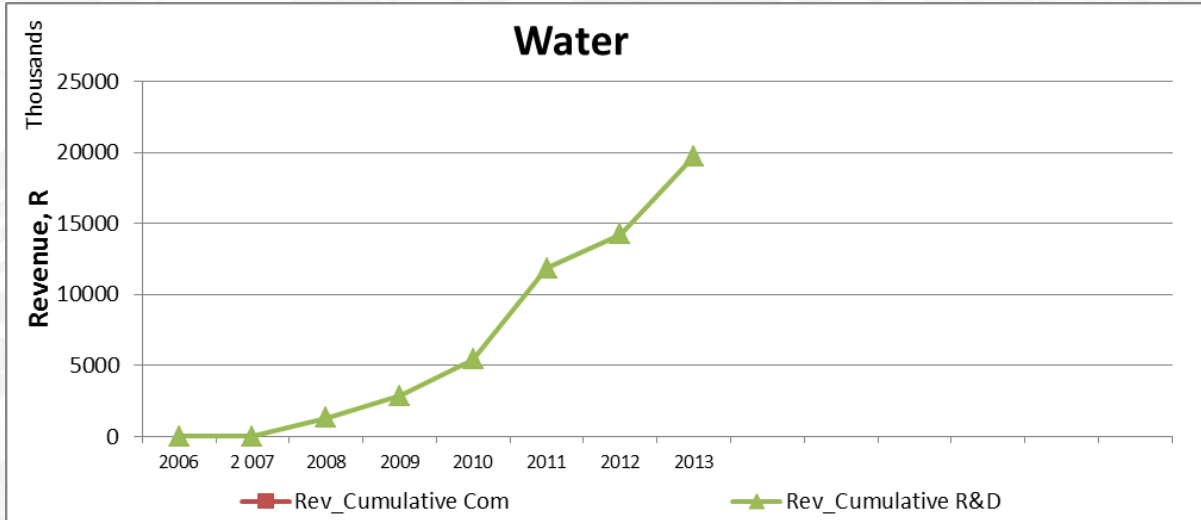
Business Analysis



Business Analysis



Business Analysis

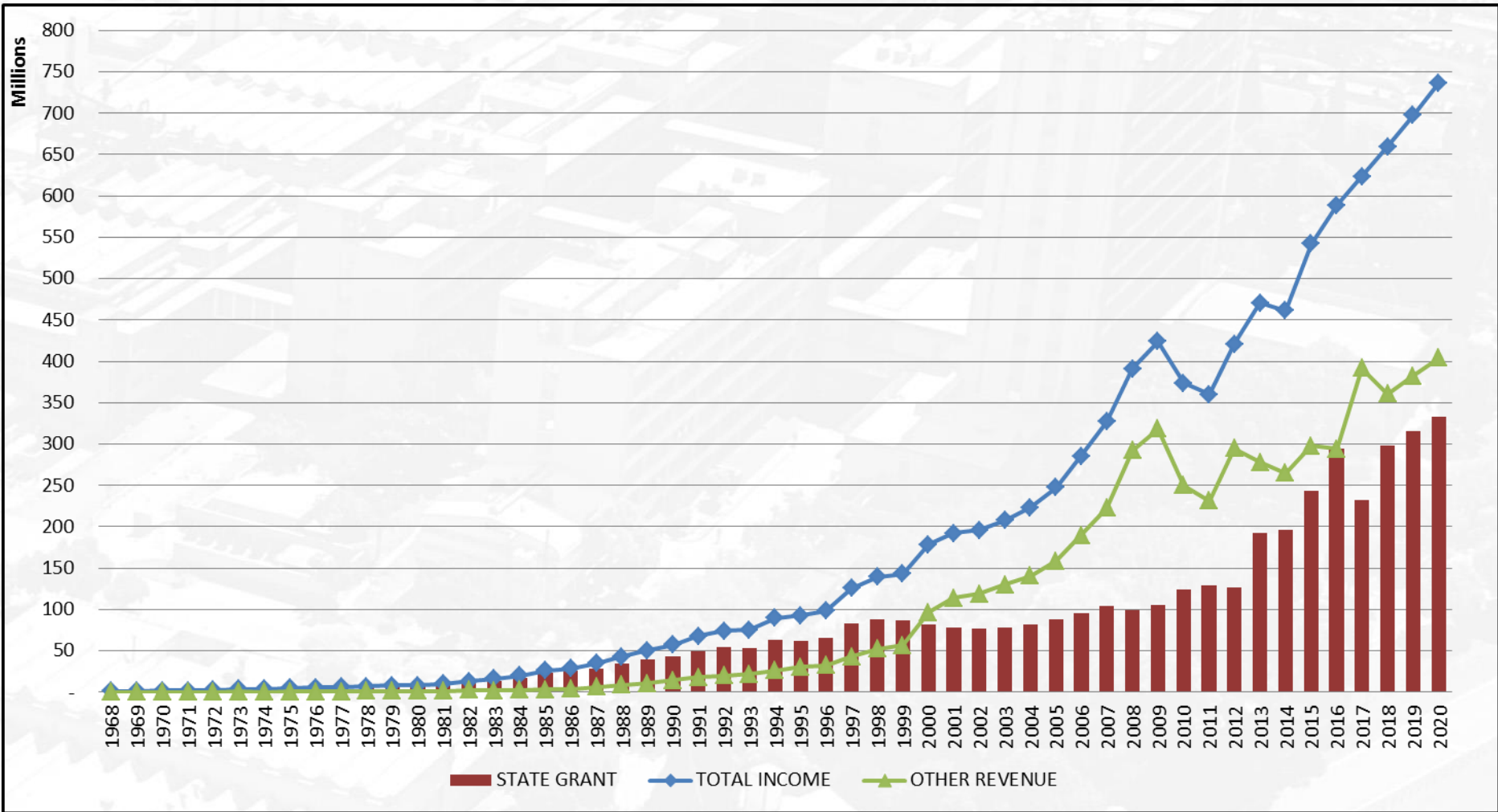


Urban Mining

- First Urban Mining material arrived on site
 - Project scheduled for July – copper collector delivery from Zambia slight delay
 - Shredder order placed with manufacturer

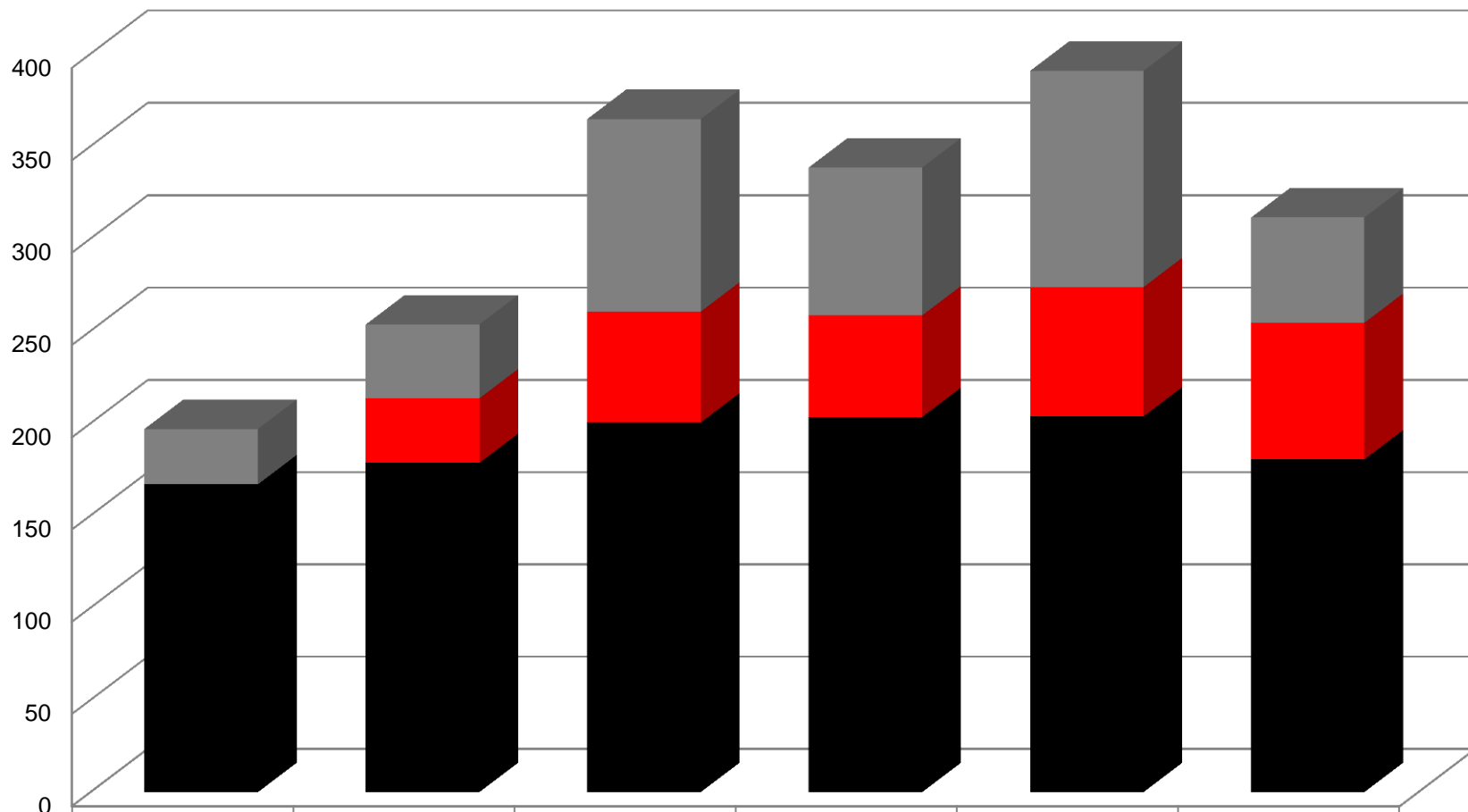


Annual Income 1968-2014



MTEF and ECSP allocations to Mintek

Funding analysis

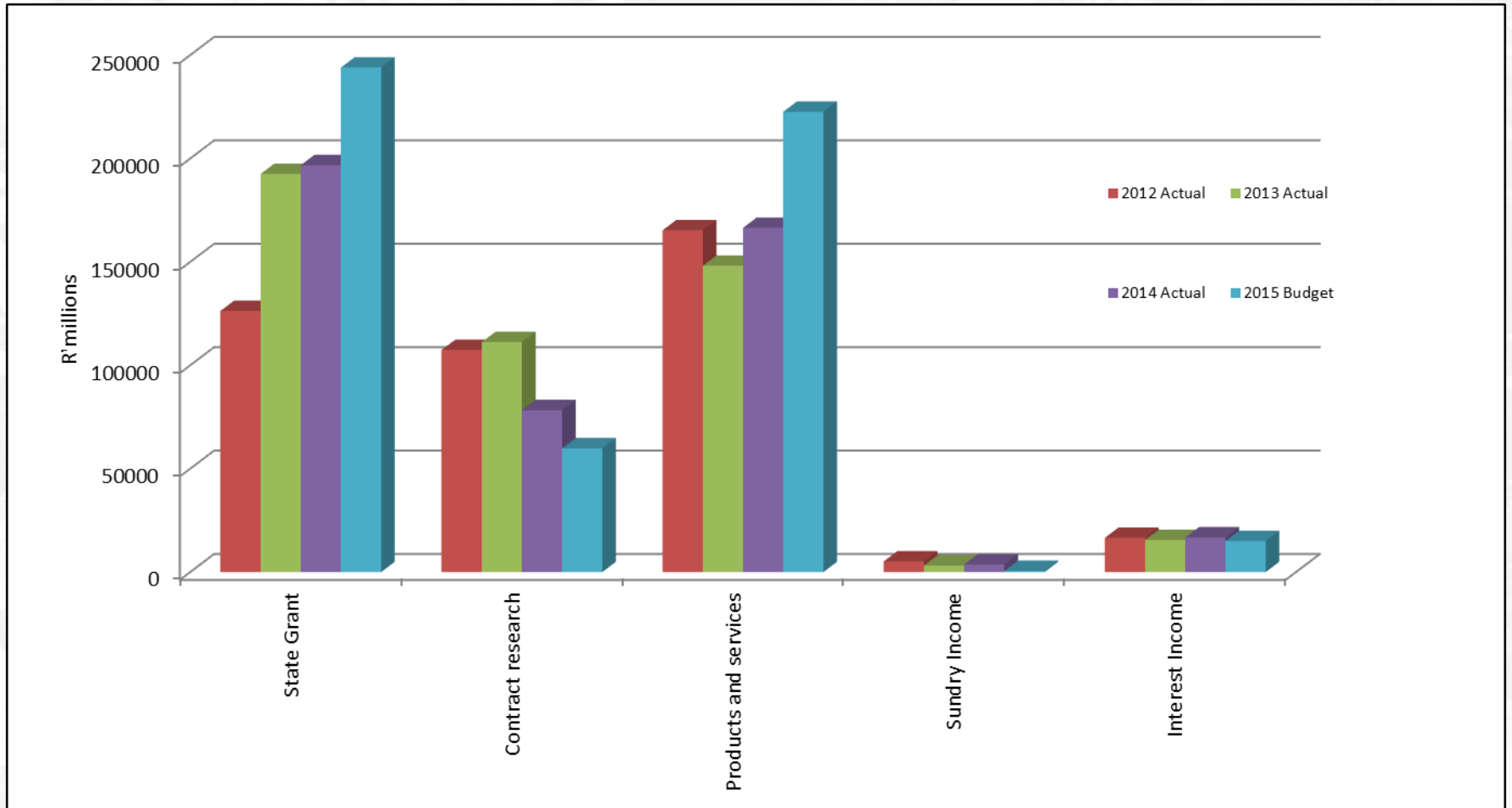


■ MTEF	30	40	104	80	117	57
■ ECSP	0	35	60	55	70	74
■ Baseline	167	179	200	203	204	180

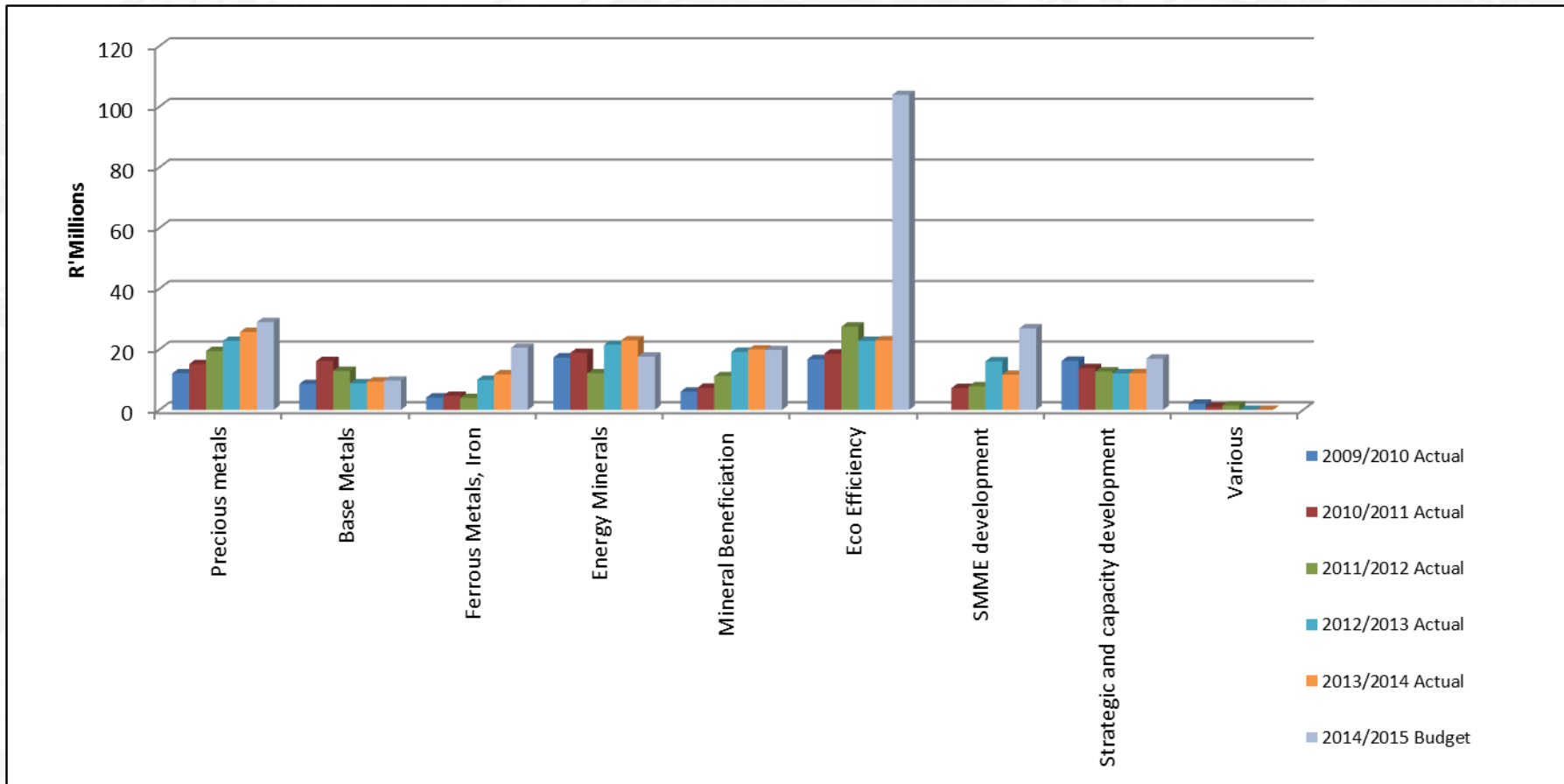
MTEF and ECSP allocations to Mintek

	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
ECSP						
Metal atomising demo plant		15				
Rare Earth pilot plant		10	15			
Northern Cape Gem Minerals		10	15	20		
Mining Effluent Facility			15	10		
Mintek infrastructure upgrade			15	25		
Water efficiency					20	20
Energy efficiency					20	24
Environmental impact					15	15
Waste and residue recycling					15	15
Total ECSP	0	35	60	55	70	74
MTEF						
Savmin acid mine drainage technology		10	20			
D&O	30	30	73	55	60	
Sensor sorting			8	10	15	15
Urban Mining			3	15	30	30
Extension of existing projects					12	12
Total MTEF	30	40	104	80	117	57
Total	30	75	164	135	187	131

Revenue



Revenue Analysis



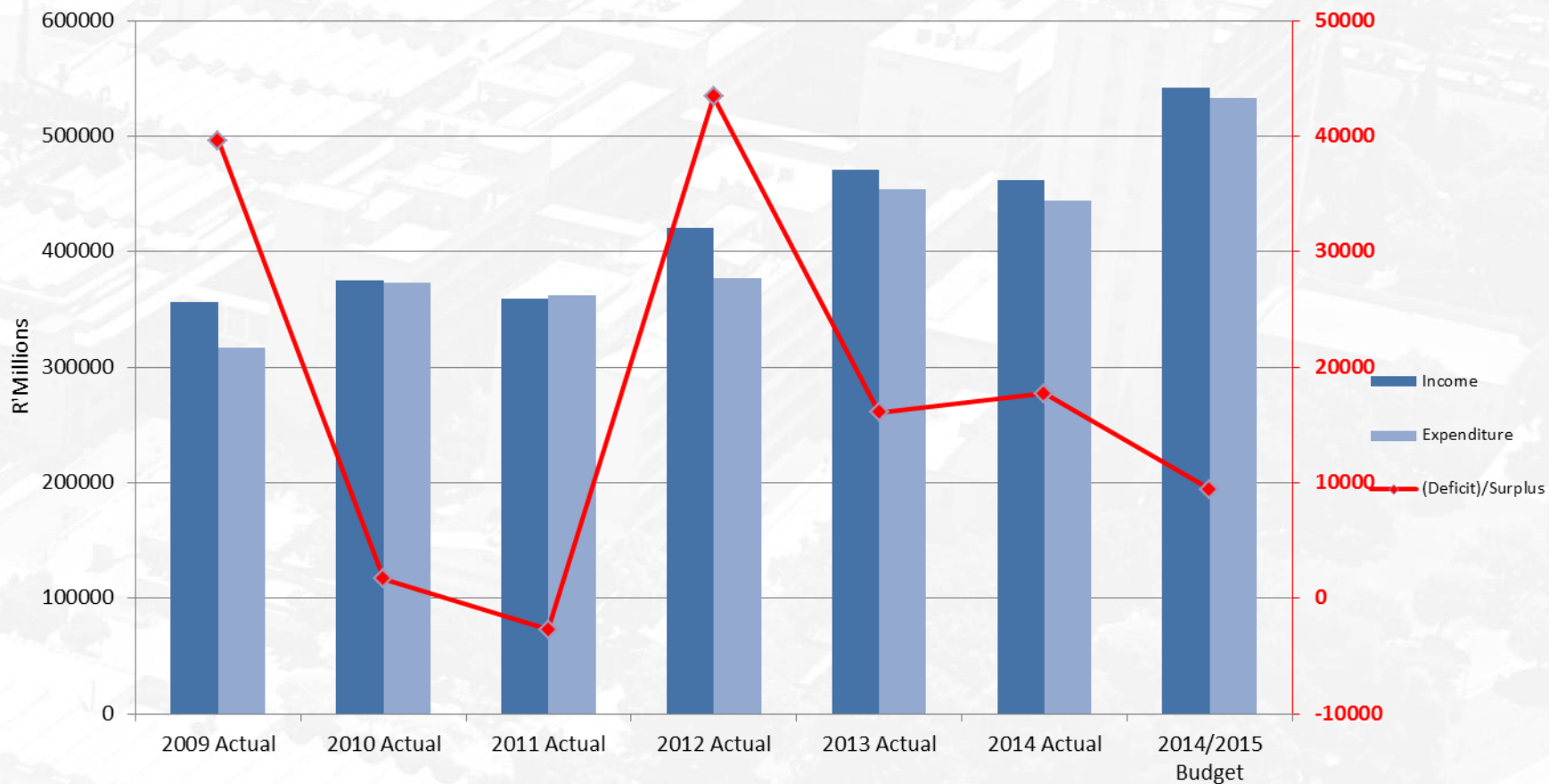
Capital Expenditure

Major capital expenditure projects

	R'mil
Solvent Extraction Pilot plant	3.5
SAVMIN Pilot Plant	4.7
Optical sorting	4.7
Semi precious gemstone facility in Northern Cape	3.3
Atomiser	40.0
Infrastructure	12.0
Future:	
Infrastructure	
Equipment	



Profitability



Financial Outlook

- Mintek maintains a strong balance sheet position with assets of more than R300m.
- Liquidity ratio is 2:1 with a strong cash flow.
- Income and expenditure trends will continue with income expected to pass the R0,5 Billion mark while main expenditure costs will be influenced by electricity charges.
- Decrease in commercial revenue as a result of economic conditions
- Increasing cost of R&D due to skills and capital investment required.
- Challenges in Bay 2.
- 2013/2014 a new contract was signed for asbestos rehabilitation for R160m.
- Return on investment (1:1.7)
- Expect the trend to continue on smaller projects and a few large ones
- Year 3 for most MTEF projects. Majority of work is research and capital related.



Human Capital Development (external focus)

- Mintek contributes to human capital development in Science, Engineering, Technology and Mathematics (STEM);
- Stimulate STEM from school level through Minquiz competition,
- Partnerships with:
 - higher education institutions will be extended to include 2 PDIs by March 2015;
 - DST, MQA and the NRF
- Provide bursary funding, on-the-job training and structured learning (target of 45 under-graduate & 15 post-graduate)
- Absorption of 100% of our bursars

Human Capital Development (internal focus)


- Provide bursaries for part-time studies to employees (target of 40 under-graduate and 51 post-graduate)
- Implement the following programmes for employee development:
 - Artisan Learnership Programme (ALP) to develop employees into artisans (annual target of 8 by March 2015);
 - Graduate Development Programme to provide comprehensive on-the-job training for newly appointed graduates
 - Work Integrated Learning, offered in partnership with MQA and places young people at steel foundries across the country
 - DST/NRF internship programme focusing on post-graduate development



CEO
Abiel Mngomezulu
Admin. Block
(Block 9)
Level 13




Research & Development
Dr Makhapa Makhafole
Admin. Block
Level 13



Finance
Sakhli Simelane
Admin. Block
Level 13




Business Development
Peter Craven
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Corporate Services
Gugulethu Nyanda
Admin. Block
Level 13



Technology
Alan McKenzie
Admin. Block
Level 13




Advanced Materials
Dr Jones Papo
Block 11
Level 6




Finance
Hester Pretorius
Block 9
Level 10



Mineral Economics & Strategy Unit
Godfrey Mothapo
Block 9
Level 12



Human Resources Development
Pauls Gibbons
Block 9
Level 11




Analytical Services
Joe Baloyi
Block 7
Level 7




Biotechnology
Petrus van Staden
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Engineering & Maintenance Services
VACANT
Block 1
(Maintenance Block)




Information & Communications
Haveline Michau
Block 9
Library




Hydrometallurgy
Dr Leon Kruger
Block 6
Level 5




Measurement & Control
Paul Brereton-Stiles
Block 9
Level 7



Minerals Processing
Bernard Joja
Block 6
Level 4



Mineralogy
Nosiphiwo Mzamo
Block 8
Level 5



Pyrometallurgy
Isabel Geldenhuys
Block 6
Level 6



Small-Scale Mining & Beneficiation
Nirdesh Singh
Block 8
Level 7



Celebrating excellence in mineral and metallurgical innovation

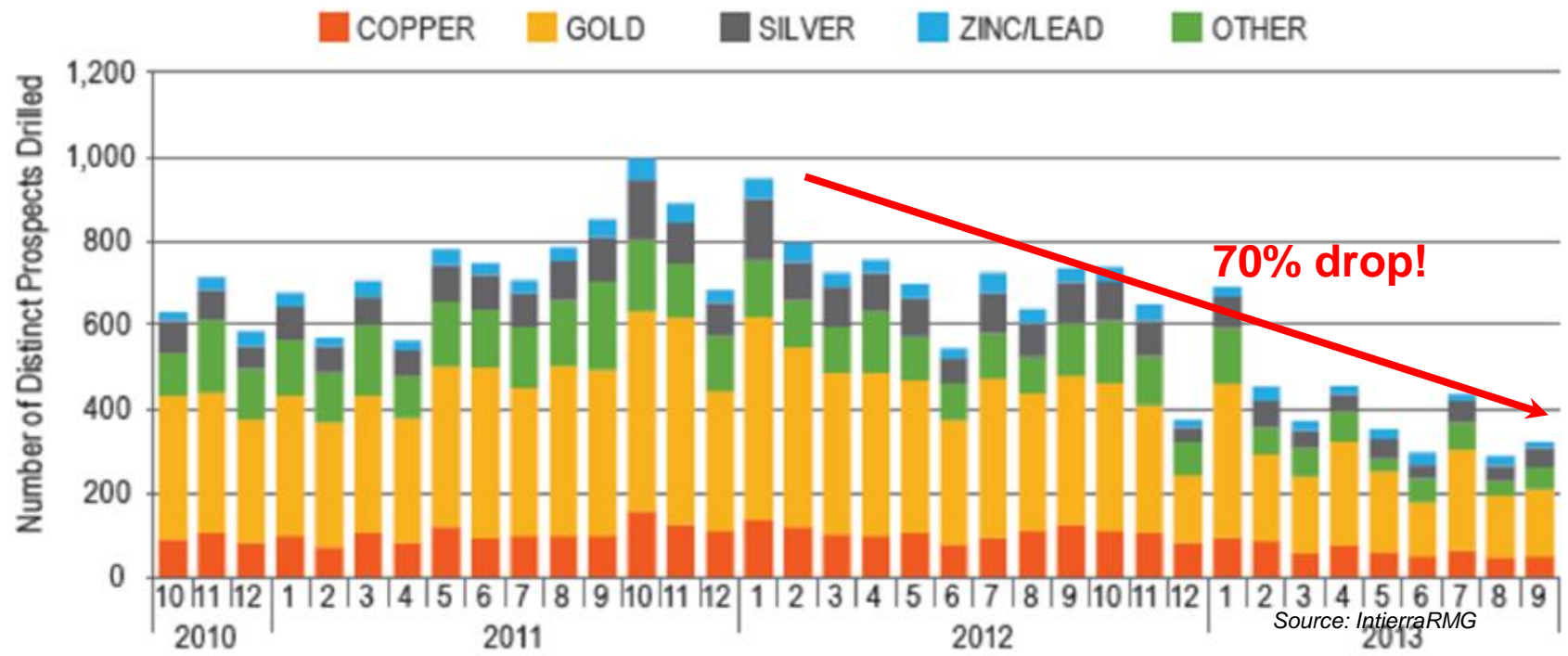
Mintek Management Structure

as at June 2014

But ...strong drop in exploration and project development

- Major mining companies have cut back on capital expenditure
- Juniors can't raise money

GLOBAL DRILLING ACTIVITY



Source: IntierraRMG

Massive impact on companies servicing mining industry

- Most SA engineering companies have retrenched – some up to 60%
- Most mining companies are reducing staff, many at senior technical level
- Other countries are also faring badly. (Australia – mining unemployment jumped 10% in 6 months and a further 30% no longer working full time)
- Mintek's competitor laboratories in South Africa and globally are struggling
- Anglo American looking at the option of selling Anglo Research – the last mining company research facility in SA

Against this backdrop Mintek is doing well!

Mintek Business Development activities

- Minerals industry business intelligence
- Commercial support to other Mintek operating units
- Intellectual Property management and commercialisation
- Coordination of Mintek marketing
- Initiation and leadership of certain special projects
- Manages Mintek's contribution to DMR rehabilitation programme

What does this mean for Mintek?

- Far less work from new projects and Junior companies
- More requests for operational efficiency improvements
- Expect slowdown to bottom out in 2015 and surge in investment, exploration and project development from 2017

... and how are we responding?

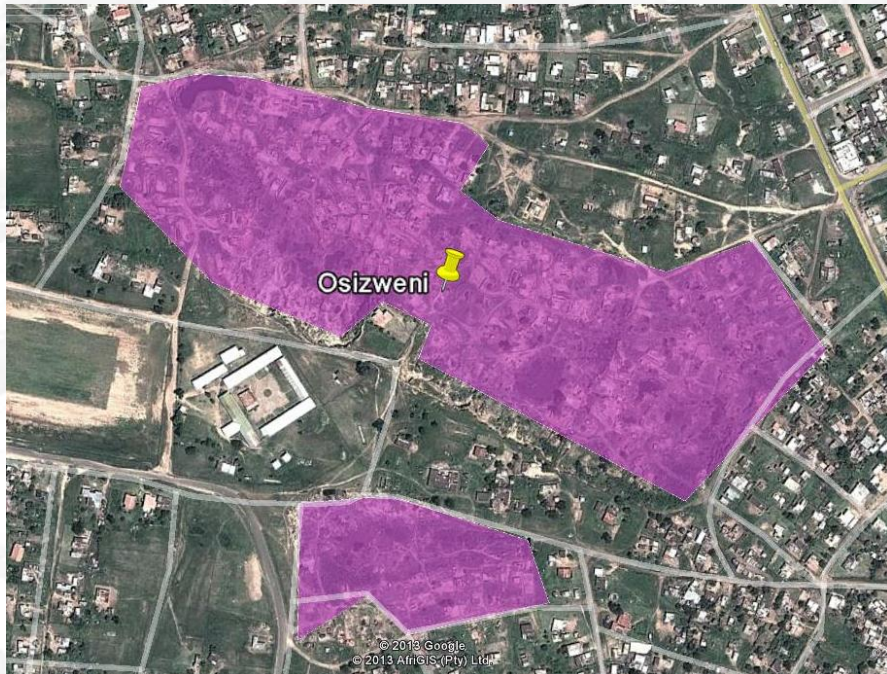
- Shifting our structure and emphasis to support **existing mine** operational improvements rather than technologies aimed at **new projects**
- Maintaining and developing capacity to handle expected upturn in 2016/17
- Developing technology for **new resource** opportunities (Bushveld titaniferous magnetite and Springbok Flats coal/uranium)
- Focusing on **strategic areas** of energy and water efficiency, environmental impact and waste treatment

Derelict & Ownerless Mine rehabilitation

- Mintek in 2nd year of 3-year (R165m) DMR contract to manage certain rehabilitation projects selected by DMR
- Mainly old asbestos mines in Limpopo and Northern Cape
- Target to complete 4 sites during 2014/15
 - Lusikisiki quarry wall (E Cape)
 - Ditabogong asbestos waste dump (Limpopo)
 - Mahlatjane asbestos waste dump (Limpopo)
 - Mang-le-mang asbestos waste dump (Limpopo)
- Busy with the evaluation or rehabilitation design of a number of other asbestos sites
- Rehabilitation concept for Osizweni approved by DMR; detailed design started

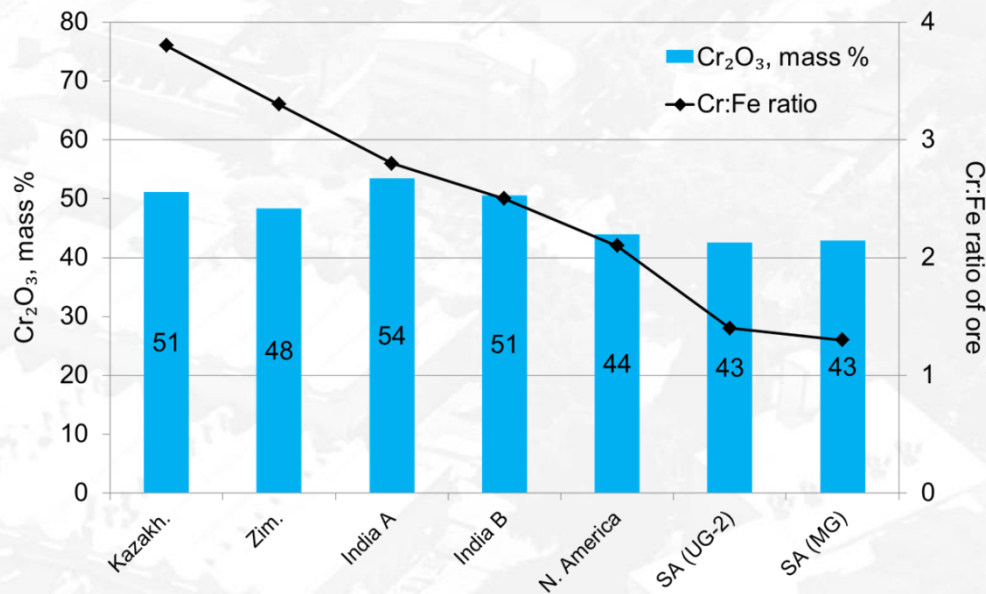
Osizweni

- Osizweni has about 20 hectare of exposed coal
- Surrounded by formal and informal housing
- Informal mining has damaged adjacent school
- Will be VERY complex and expensive



Emerging focus areas

- Smelting of low grade Chromite
 - The chromite industry is in decline with the export of more ore and the production of less ferrochrome. Mintek has developed and patented a process for smelting low grade chromite to produce ferrochrome. The project is being developed with a local BEE junior mining company.



Processing of e-waste

Electrical: 50% of total

Electronic: 50% of total

30%
Washing
air con
cleaner
toaster

20%
Refrigerator

- 60 million tons per year is generated globally; about 15% is recycled
- EU has 50% of world share of waste recycling industry ...
 - 60,000 companies
 - 500,000 employees
 - €24 billion turnover
 - 1.3 million tons dumped in Africa and Asia
- SA produces 340,000 tons annually - 6,6 kg per person annually (US 30, China 5)



2 recycle options

Modern and safe



Sorting facility in Boston



Attero facility in India



Primitive and dangerous



5,500 sweatshops in Guiyu recycle 1.5 million tonnes a year

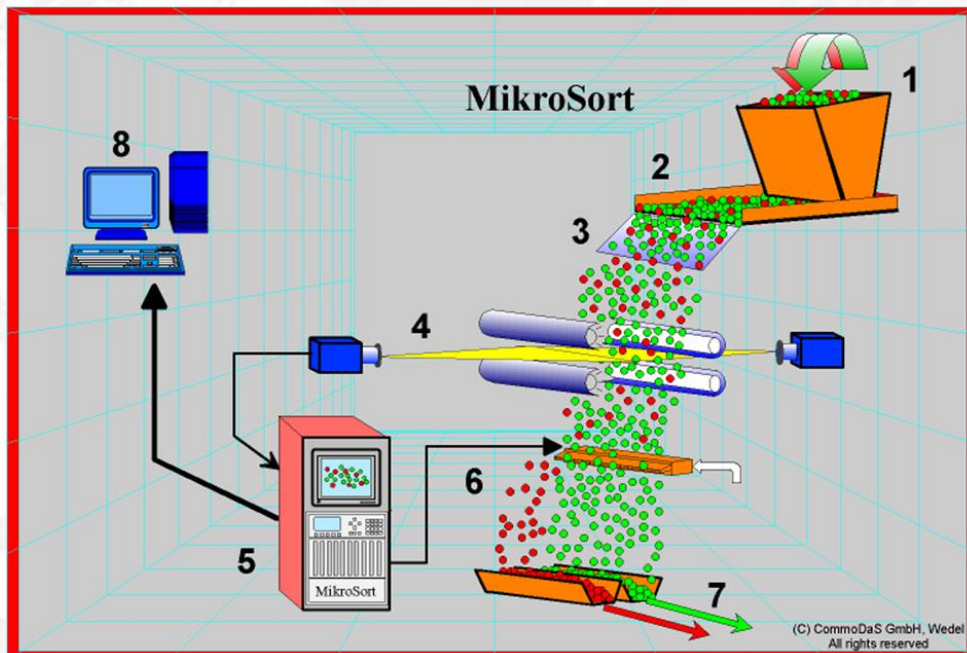


Burning off plastic, releasing lead, cadmium



Sorting of coal

- South Africa has large deposits of low grade coal, the purpose of the project is to develop technology that allows for the upgrading of below specification coal for use as a feedstock by Eskom.
- Are entering the 2nd year of a 3 year programme.
- Laboratory testing and development will be concluded this year



Rare Earth Element processing

- Will be undertaking a number of campaigns in our new Rare Earth pilot plant.
- Rare Earth project development companies have been heavily impacted by the global mining downturn.
- Will be concentrating on Rare Earth waste stockpiles at heavy mineral plants as a feedstock to initiate a local refinery.



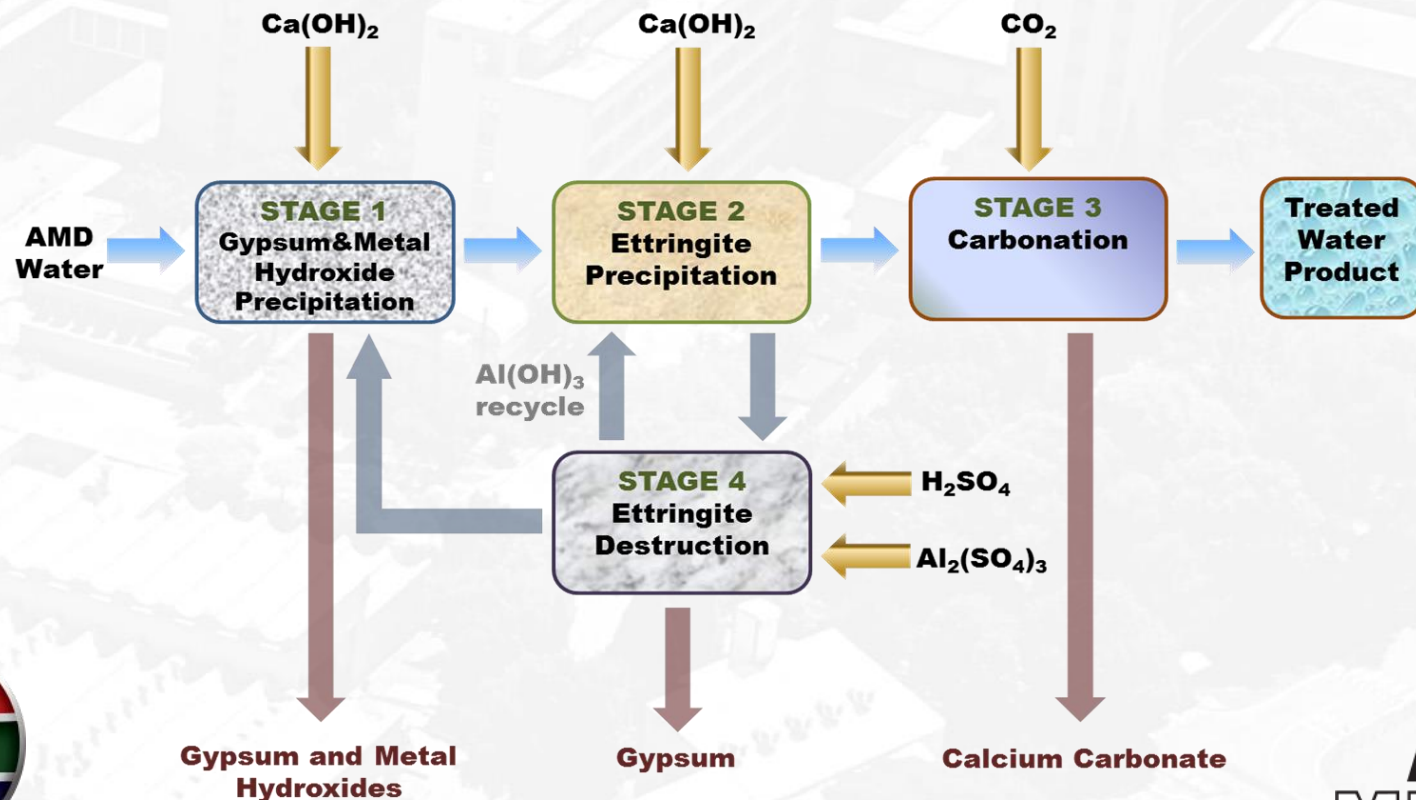
SAVMIN water treatment process

- The technical programme of assessing the SAVMIN water treatment process will be completed during the year.
 - Processing Acid Mine Drainage at a site on the West Rand.
 - The main aim is to show that process improvements significantly reduce the processing cost – Technically the process works but is it cost effective.



Plan

- 7 July start 2 week commissioning with Veolia.
- Plant should be producing water by the end of July.
- Phase 1 and 2



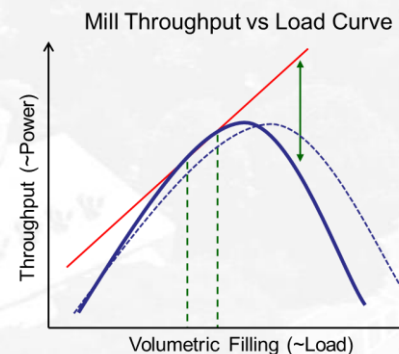
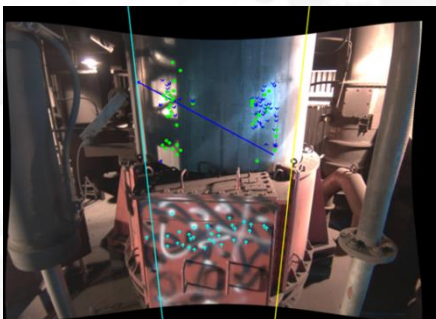
Measurement and Control - Business

- Select local support partner in South America
- Explore opportunities of local support partner in FSU
- Roll-out “Remote Access Device” to local clients
 - Developed in FY2014
 - Facilitates pro-active support of process control systems in operation at local PGM, Gold & Ferroalloy sites
- Secure first sales of:
 - Carbon Concentration Meter (Gold Leaching)
 - SlipCam (Ferroalloy smelters)
 - Mill Throughput Optimiser (Gold & PGM Concentrators)



Gold leach tanks

SlipCam view of an Electrode



Measurement and Control – R&D

- Produce Low Cost CN Measurement Instrument

- Targeted at smaller, price-sensitive gold producers
- Based on highly successful Cynoprobe technology
- Enable measurement & control of free CN in gold leach circuit
- Optimise recovery and control cost and environmental impact

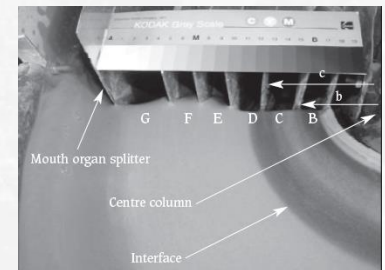
- Advanced Control in Mineral Sands

- Produce a prototype spiral cut monitoring instrument
- Conduct pilot plant testwork on novel spiral cut actuation device
- Tests show recovery can be improved by 10% by correct positioning of splitters
- A 10% recovery improvement on a Zircon/Rutile plant results in R100m's/annum extra production



- Materials Handling/Ore-sorting

- Existing technologies will be reviewed
- Identify areas where advanced instruments (e.g. machine vision) and process control can have impact



Recycle at FeCr Smelters, Mine Waters Treatment

1. Capture Cr(VI), render safe as Cr(III) using biodegradable reductant, absorb for recycle to furnace.
2. Investigate re-use of FeCr slag as neutralising agent.
3. Investigate treatment options (combination of conventional and novel) for mine waters stored on site.



SSMB - Community Development

Targets/plan for 2014/15

- Set-up of 5 SMME's and to create 60 jobs
- To train 140 people (jewellery, beads, pottery, SSM)
- Focus on improving market access for products

Northern Cape Gemstone project



Upington

- *Mill Craft Centre*
- Jewellery Manufacturing (20 learners)
- Gemstone cutting/polishing (10 learners)
- Glass Beads (10 learners)
- Pottery (10 learners)



Prieska

- *Empilisweni Youth Centre – launched in June 2014*
- Jewellery Manufacturing (20 learners)
- Gemstone cutting/polishing (10 learners)
- Glass Beads (10 learners)
- Pottery (10 learners)



Kimberley

- *Kimberley International Diamond and Jewellery Academy (KIDJA)*
- Jewellery Manufacturing (20 learners)
- Gemstone cutting/polishing (20 learners)
- Glass Beads (15 learners)
- Pottery (15 learners)

Catalysis Research

Precious Metals Catalyst Development

- The development of automotive catalyst formulations and testing under the DST-AMI project
- Scale up generic palladium catalyst in our pilot facility
- Develop catalysts for applications like biofuels production and methane to methanol production



Products and Services

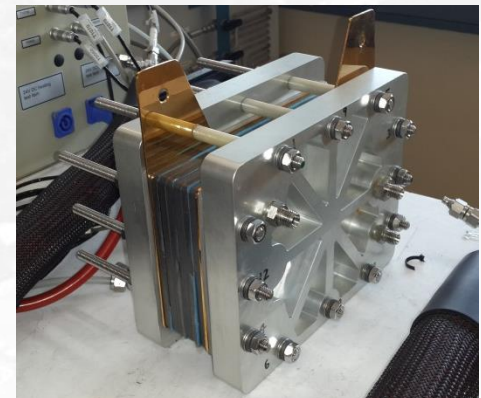
- Continue to grow the sales of our standard AuroLite™ gold based catalysts
- Undertake a wider performance validation of our ceramic monolith AuroLith™ catalysts to attract customers.
- Offer our HySA fuel cell catalyst as a commercial product



AuroLite™ Gold Catalyst

HySA Catalysis Centre of Competence

- Develop a 1 kW fuel cell stack
- Incorporate advanced PtCo catalysts into MEAs
- Scale up an industry benchmarked PtRu catalyst for direct methanol fuel cells



Concluding Remarks



Thank You
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