

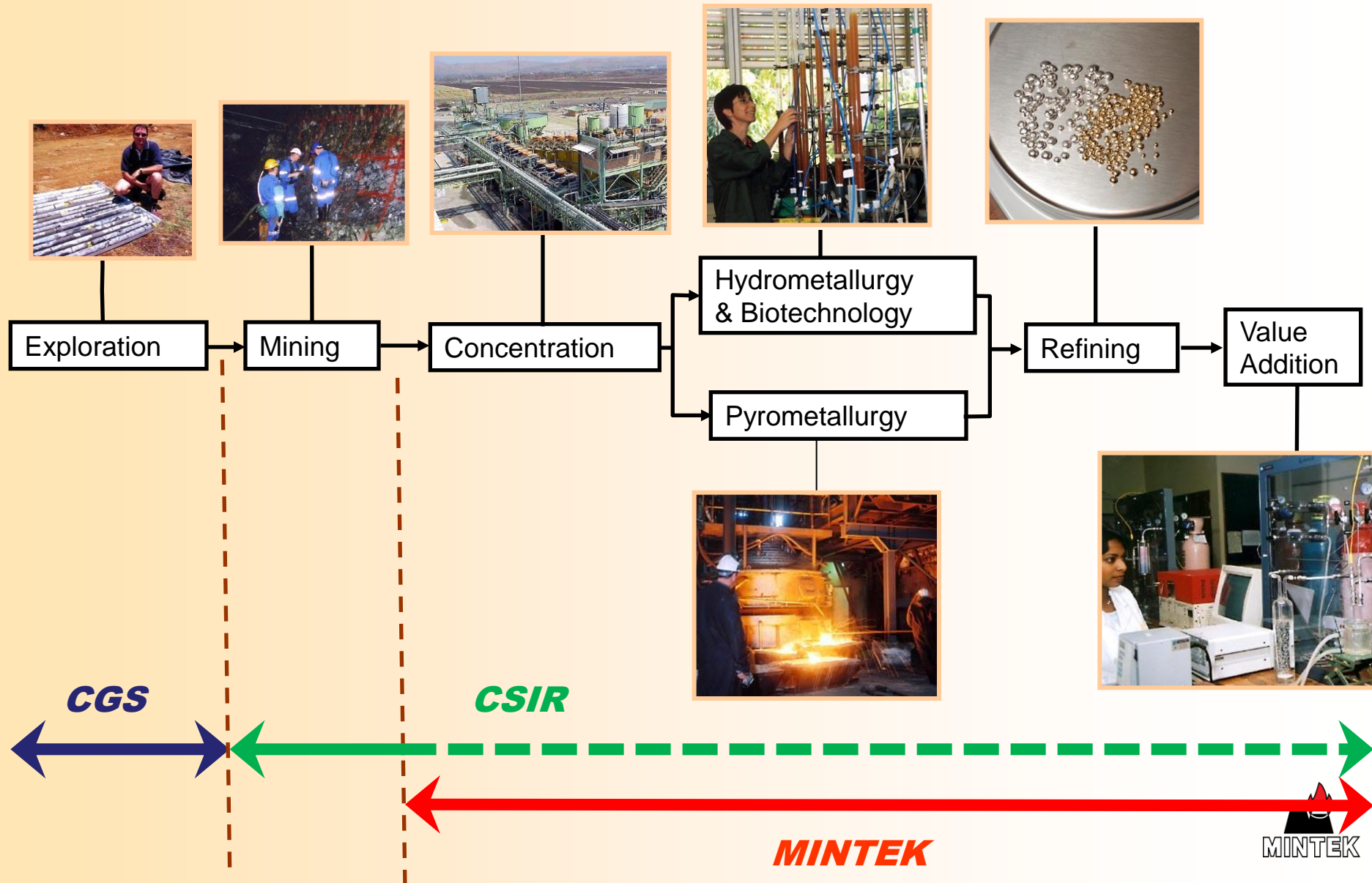
# **MINTEK**

## **2013/14 Strategic Plan Briefing**

to the  
**Select Committee on Economic Development**

**18 June 2013**

# Mintek operates in the latter stages of the 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

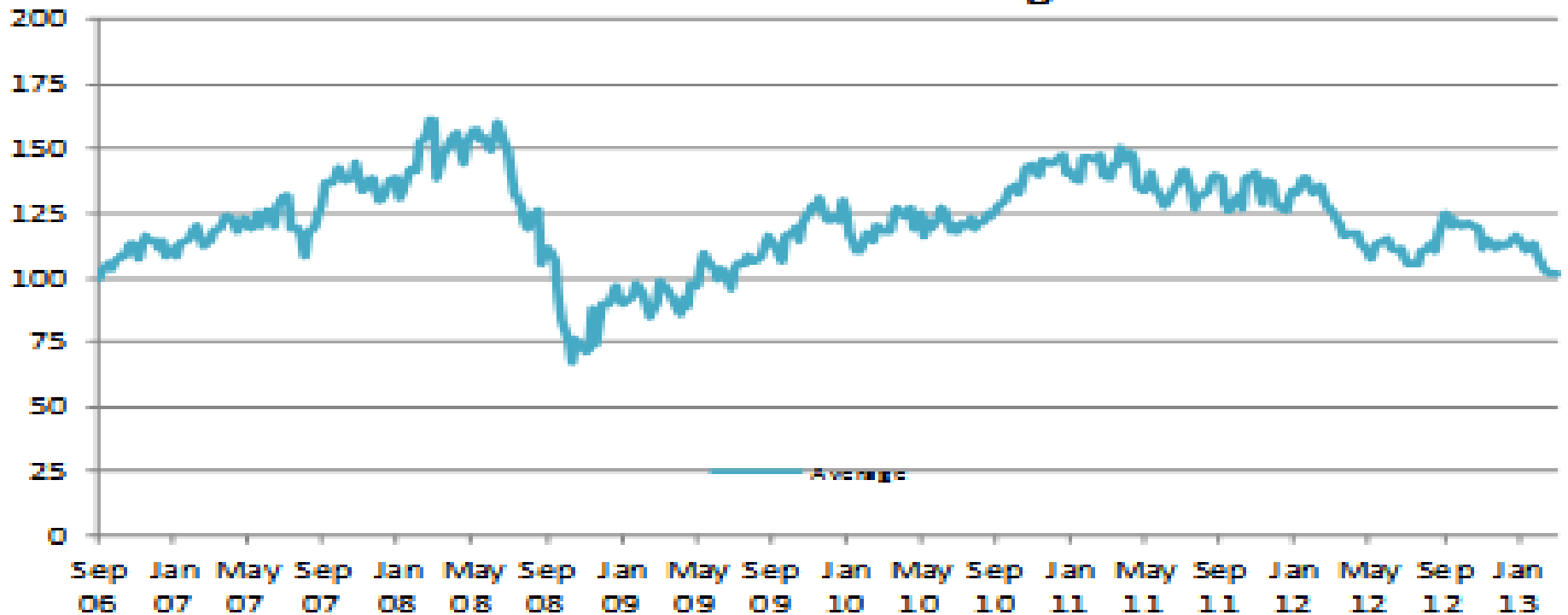
# Mintek Approach to R&D Planning

- Research themes derived from government priorities
- Early-stage R&D funded from Baseline State Grant (approx R210m for 2013/14)
- Selected, promising R&D outcomes further developed using MTEF and ECSP funding (approx. R100m for 2013/14)
- Treasury approach to R&D funding – now allows more sustainable, longer term planning (better structured approach, coordinated with other entities, towards common goals)
- Mintek's ratio of R&D to Products & Services increased to 60:40 approx.

# Mintek's Business Environment

- After a 2 year initial recovery period from the recession, Chinese, US and European metal demand fell again over the past 2 years
- Medium- to long term growth prospects are good, and supply capacity in many sectors is probably being over-estimated
- Mintek is seeing reduced demand for services, and expects this to continue through 2013/14 and 2014/15

**Index of Global Mining**



# Mintek Management Structure



**Mintek Management Structure**  
as at April 2013

# Corporate Services

# Human Development

- Development of Human Capital
- Maintain a world class R&D competency
- Enhance transformation agenda
- Manage occupational Health, safety and well being of employees



# Internship Partners

- DST/NRF
- DST/NRF PDP
- DST/TAP Foundry
- MQA/HET
- SAASTA/YSP
- MQA/WIL
- MQA/UIF

# AMD MQA Interns: 1999 to 2008

No.	Surname	Name (s)	Qualification	Year	Status
1	Mokoena	Elizabeth	N.Dip	1999	At Arcelor Mittal as a Metallurgist
2	Mkhali	Magdeline	N.Dipl	1999	At Element 6 as a Metallurgist
3	Mokaleng	Patrick	N.Dip	2000	Employed by Sasol as a Manager
			B.Tech	2003	
4	Smit	Melanie	N.Dip	2000	At Mintek as a Principal Technician
5	Qhamkoane	Tshidiso	N.Dipl	2005	Employed by Sasol as a Metallurgist
6	Dhlamini	Daniel	N.Dip	2005	Employed by Transnet as a Foundry Manager
7	Tawane	Veronica	N.Dip	2005	Employed by Denel as a Metallurgist
			B.Tech	2007	
8	Kantwela	Sibusiso	N.Dip	2007	Employed at Mintek and enrolled for B.Tech at VUT
9	Mphela	Caroline	N.Dip	2007	Employed at Mintek as a Technician
			B.Tech	2009	
10	Khoza	Tiyani	N.Dip	2008	Worked at Prima as a Technician
			B.Tech	2010	
11	Madiba	Tutu	N.Dip	2008	Employed at Viking Foundry as a Technician
12	Morudu	Veronica	N.Dip	2008	Employed at Mintek as a Technician
			B.Tech	2010	

# DST-TAP WIL Objectives

- To match students enrolled for N.Dip studies (i.e. P1/P2) with the relevant foundries in order to assist them in acquiring experiential training
- To fulfil the graduation requirements for their Diplomas
- To allow the B.Tech and M.Tech students to undertake medium to long term projects that may be crucial to the foundries competitiveness and growth
- Mintek to **monitor and mentor** the students very closely, in partnership with the foundries
- To make it easier for the Foundries to absorb the interns (reduction of un-employment), as part of IPAP (Industrial Policy Action Plan 2011/12 – 2013/14)

# Foundries taking Part in the DST WIL

Foundry Name	Province	City	Name
Prima Industrial	Gauteng	Benoni	Mr Cypi Kyalu
Thomas Foundry	Gauteng	Germiston	Mr Barry Buttler
Autocast	NW	Brits	Mr Coenie de Jager
IPT Pefco	KZN	Pinetown	Mr Brian Seviour
Guestro Automotive	Gauteng	Benoni	Ms Dalmarie McQueen
Pressure Die Casting (PDC)	KZN	Pietermaritzburg	Mr Mike Wolhuter
McWade Productions	Gauteng	Olifantsfontein	Mr Terence Stopforth
Preformed Line Products	KZN	Pietermaritzburg	Ms Varishma Hariparsad
Preformed Line Products	Gauteng	Germiston	Mr Ronny Boshoff
Pfisterer	KZN	Pietermaritzburg	Mr Thabani Nene
M.I.S. Engineering	Gauteng	Alberton	Mr Graham Anderson
LTI	Limpopo	Polokwane	Mr Muthu Nemadodzi
FabLab	Limpopo	Polokwane	Ms Noksy Letsoalo
Nicast	Gauteng	Vereeniging	Mr Andre Elhers
Servcast	Gauteng	Meyerton	Mr Peter Hougaard
SARCO	Gauteng	Vereeniging	Mr Peet van Tonder

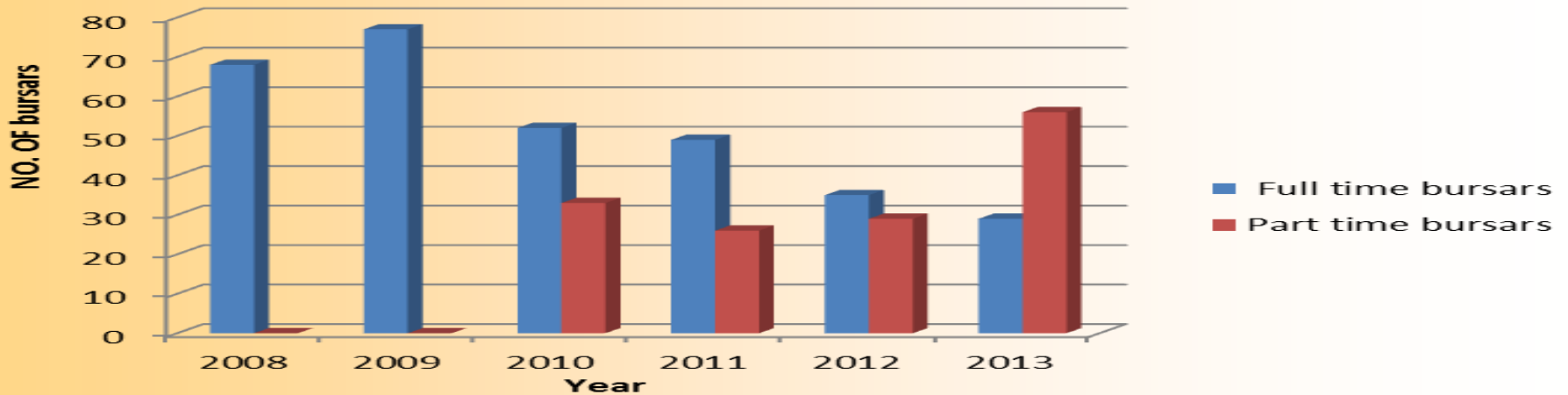
# DST Foundry Interns 2013 (Phase 2)

Phase 2 of the DST WIL programme consists of 15 interns (from 1<sup>st</sup> March 2013 to 31<sup>st</sup> March 2014)

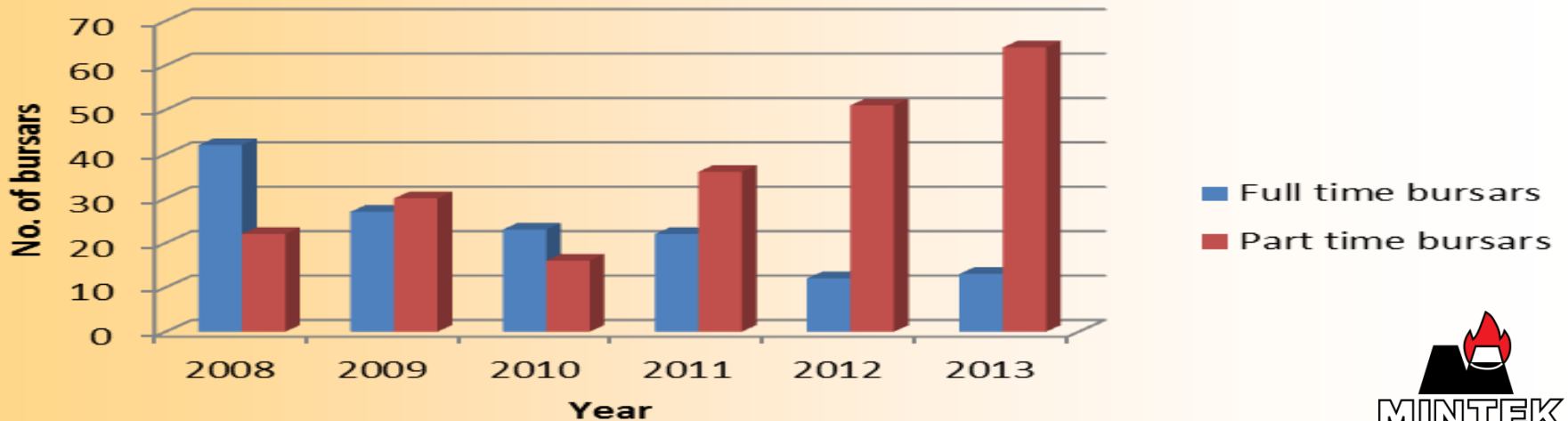
No.	Surname	Name (s)	Level	Foundry Placed	Status
1	Nqoloane	Bongiwe	N.Dip	Thomas	Started training on the 2 <sup>nd</sup> April 2013
2	Kokota	Elsie	N.Dip	Thomas	
3	Magayisa	Happy	N.Dip	Thomas	
4	Motlhoki	Lea	N.Dip	Thomas	
5	Shalang	Tumelo	N.Dip	ETS	
6	Mphwatshirema	Seani	N.Dip	PLP	
7	Tshehla	Phindile	B.Tech	PLP	
8	Maja	Mosima	N.Dip	McWade	
9	Buthelezi	David	N.Dip	Guestro	Started training on the 18 <sup>th</sup> March 2013
10	Mafanele	Dumisani	N.Dip	Thomas	Started training on the 02 <sup>nd</sup> April 2013
11	Leballo	Pertunia	N.Dip	Guestro	
12	Nkuna	Thulani Rich	N.Dip	Thomas	
13	Magagane	Ndumiso	N.Dip	McWade	
14	Maganye	Matimba	N.Dip	Thomas	
15	Mohlala	Prudence	N.Dip	Prima	

# Mintek Bursars

## UNDERGRADUATE



## POSTGRADUATE



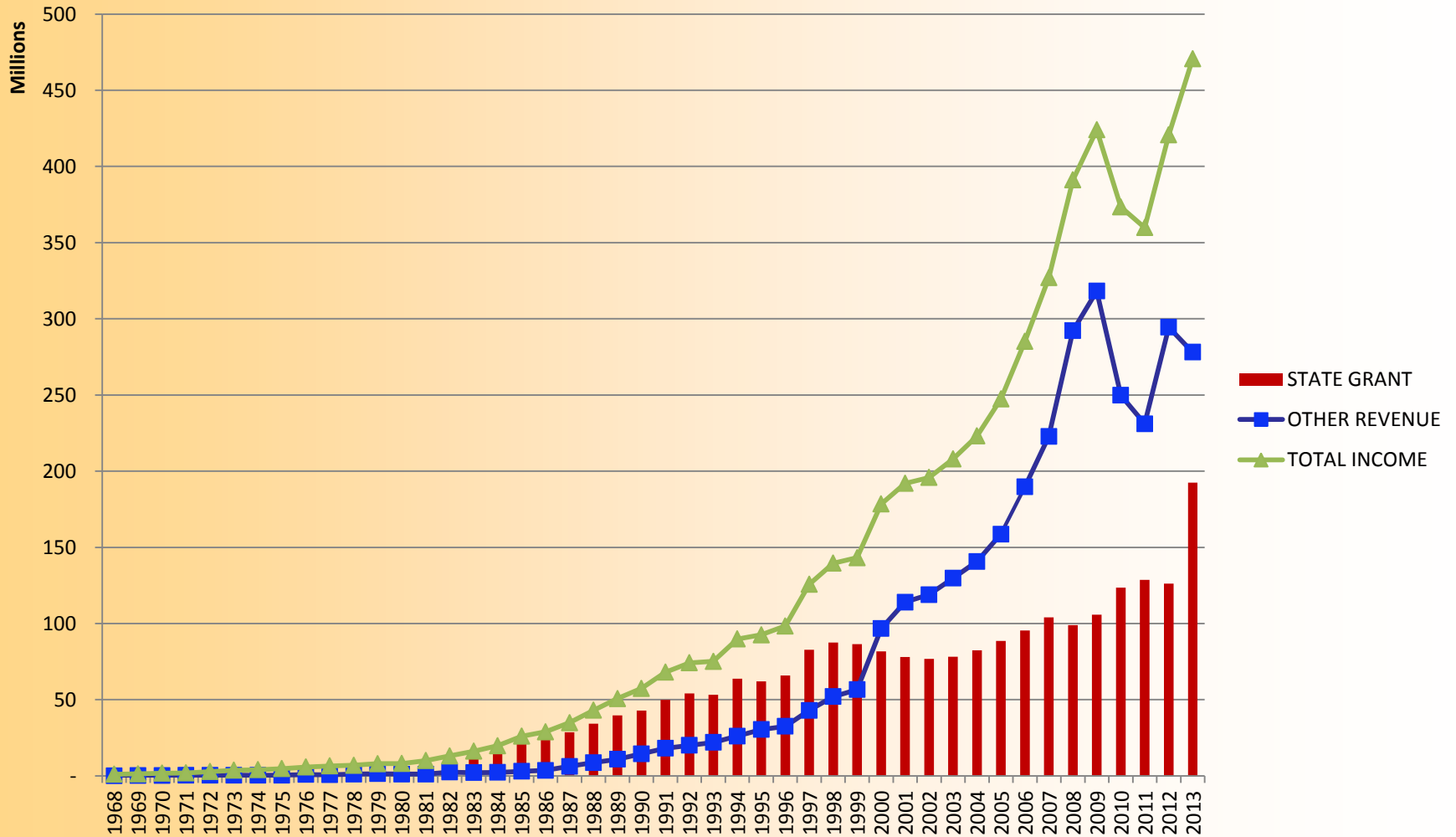
# Key Plans for the 2013/14 FY

- Strengthening the professional and leadership pipeline
- Formalisation of Coaching and Mentoring
- Increasing Masters and PhD enrollments
- Building strategic collaborations with local and international institutions
- Skills Audit
- Targetted placement of people with disabilities
- Automation of the HR processes
- Reviving ABET
- Enhancing Staff retention interventions

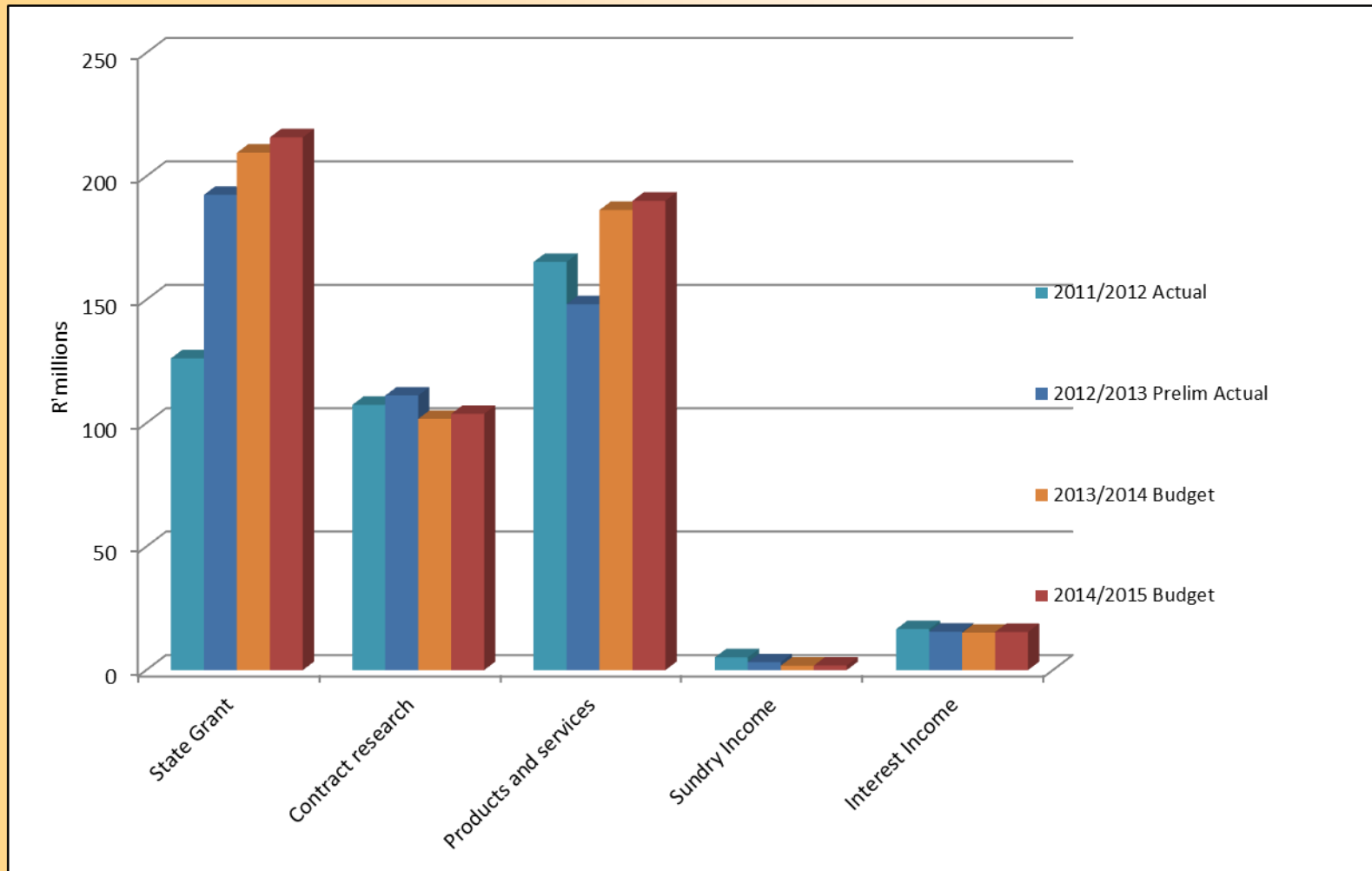
# Finance



# 1968-2013 Annual Income

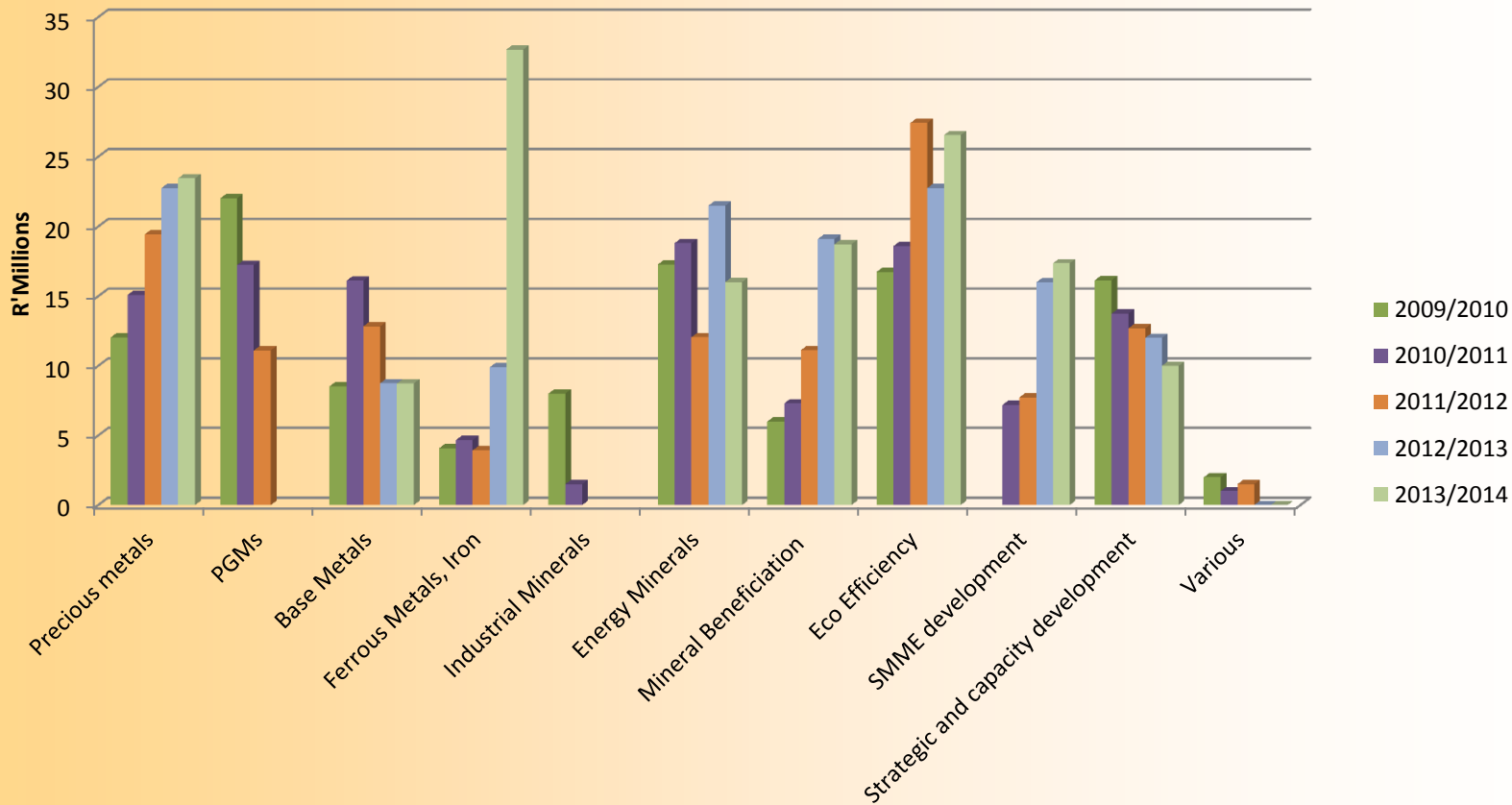


# Revenue

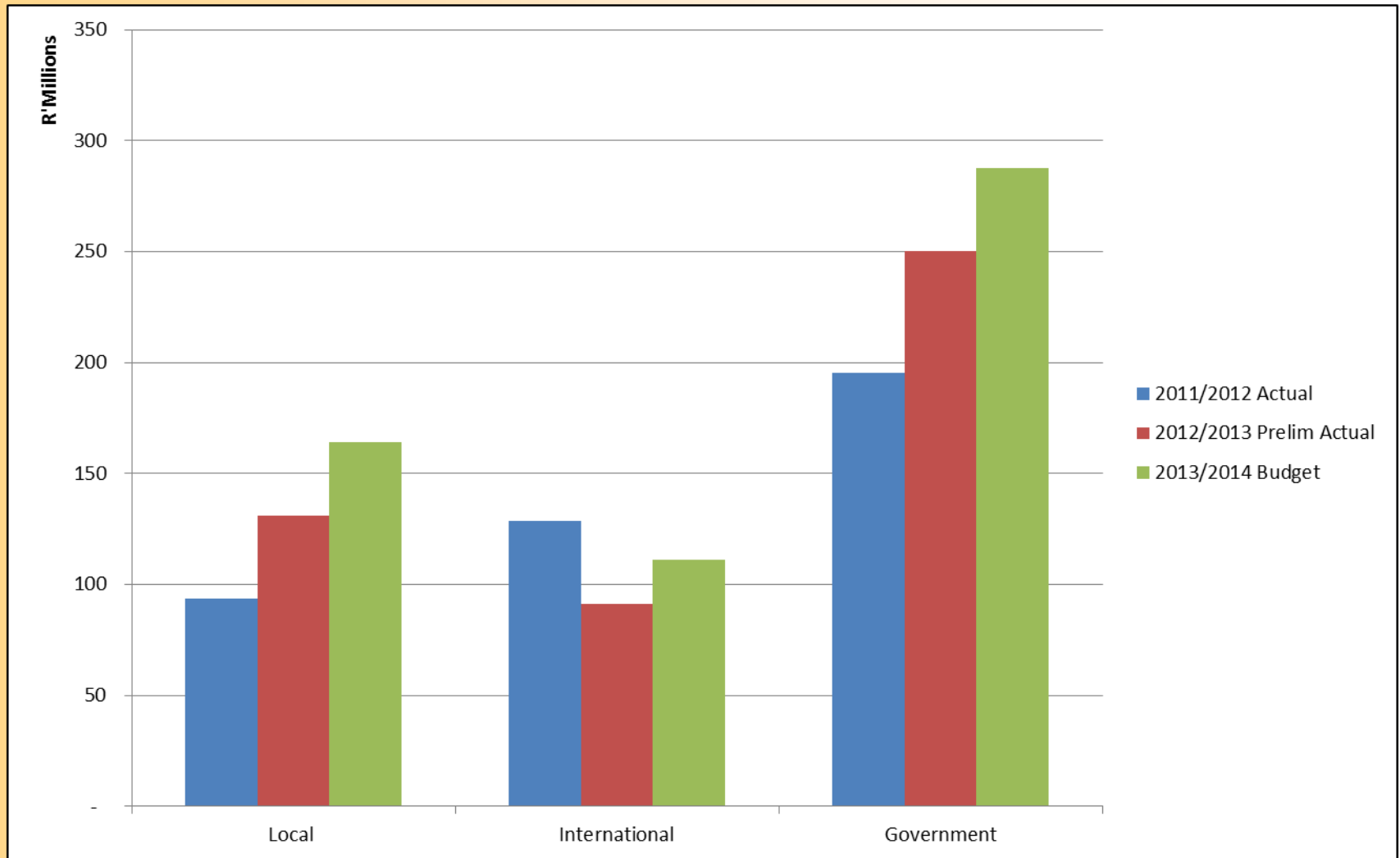


# Revenue Analysis

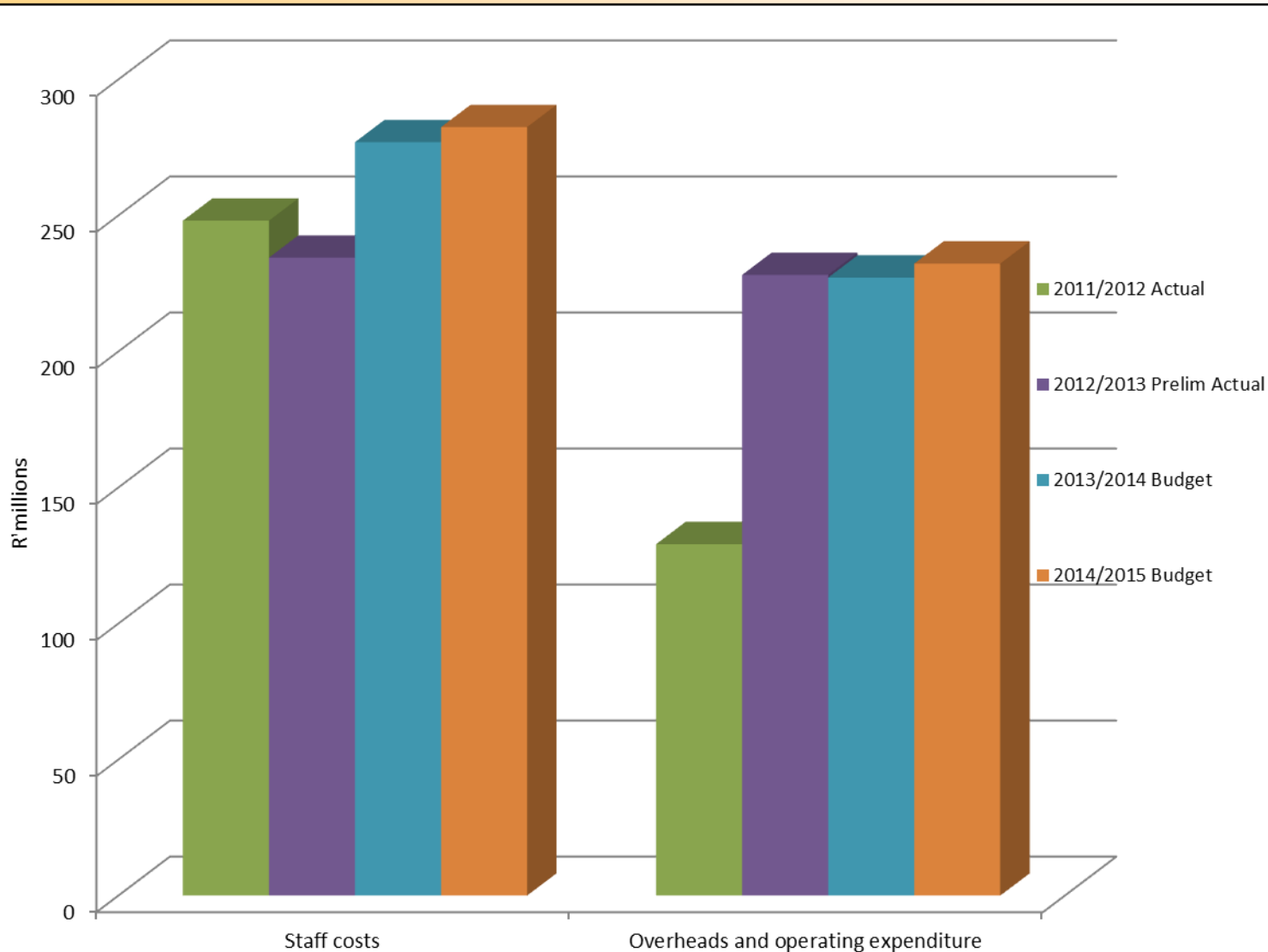
## State revenue grant per commodity



# Revenue Analysis



# Expenditure

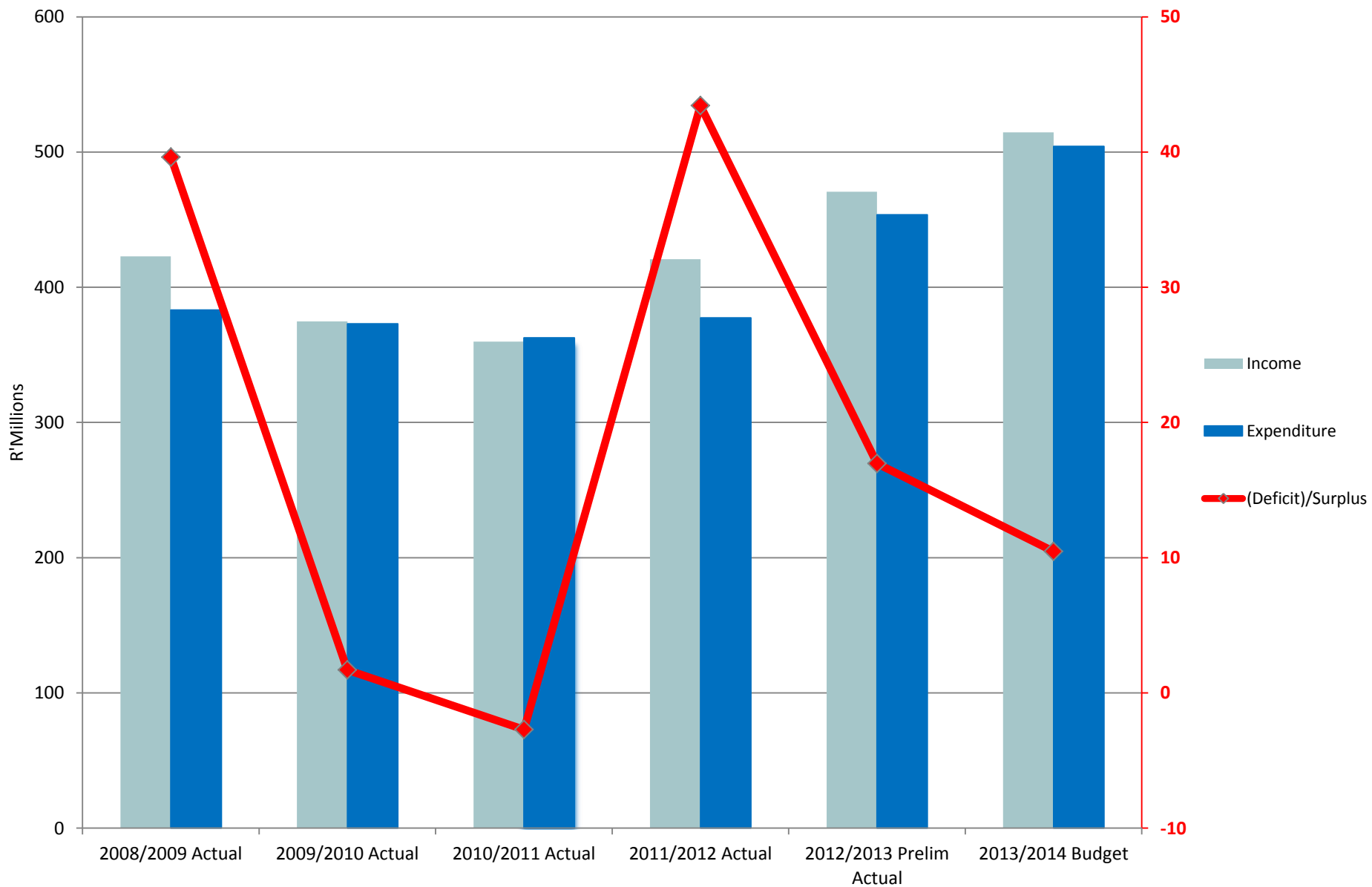


# Capital Expenditure

## Major capital expenditure planned for 2014

Solvent Extraction Pilot plant	R3,5 million
SAVMIN Pilot Plant	R4,7 million
Optical sorting	R4,7 million
Semi precious gemstone facility in Northern Cape	R3,3 million
Laboratory Equipment	R2,4 million
Infrastructure	R12 million

# Profitability



# 2014 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
- Smelting and processing in new atomiser expected to improve.
- 2012/2013 was the final year of 3-year rehabilitation project and the project is to continue.
- Expect the trend to continue on smaller projects and a few large ones.
- Year 2 for most MTEF projects. Majority of work is research and capital related.



# Business Development

# Mintek Business Development activities

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

# D&O Projects completed in 3 year contract

Project	Location	Cost (R'm)	Temporary jobs created
Osizweni closure plan	KZN	1,5	
Heuningvlei mine rehabilitation	Northern Cape	9,2	3
Vergenoegd rehabilitation	Northern Cape	4,9	25
Ga-Lotolo rehabilitation	Northern Cape	5,9	28
Lokaleng rehabilitation	Northern Cape	8,4	28
Penge & Maretlwane rehabilitation	Limpopo	22.4	60
Bestwell shaft closure	Northern Cape	0.1	
Prieska Old Hospital site	Northern Cape	13,9	33
Heuningvlei revegetation	Northern Cape	3,0	23
Strelley revegetation	Northern Cape	4,3	24
Langley revegetation	Northern Cape	3,8	9
Prieska Parklands Project	Northern Cape	2,9	22
Mafefe Kappa rehabilitation	Limpopo	3,3	12
Kromellenboog rehabilitation	Limpopo	3,0	25
Penge vegetation project	Limpopo	3,0	29
<b>TOTAL</b>		<b>89,6</b>	<b>321</b>

# Rehabilitation of Derelict & Ownerless Mines

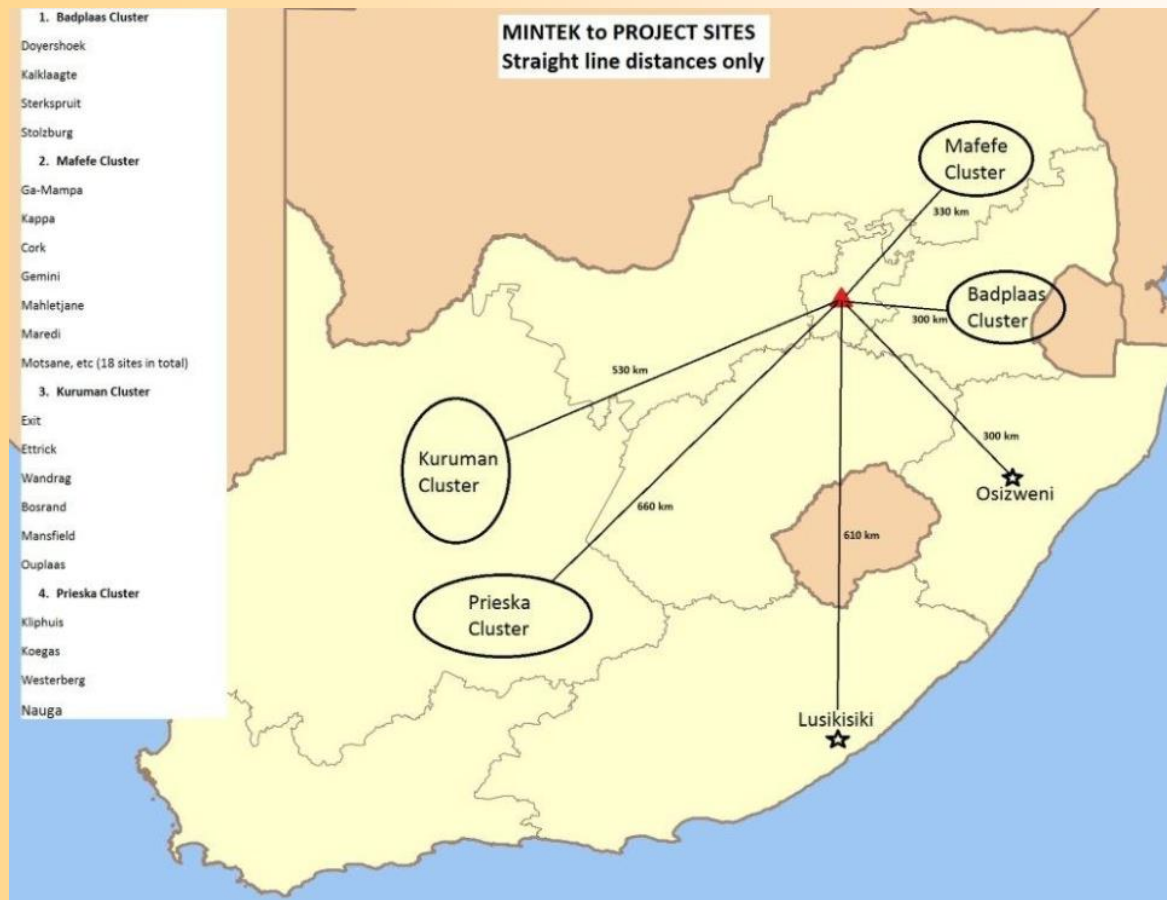
- Mintek managed a 3-year programme of mine rehabilitation for DMR, ending on 31 March 2013, to the value of R 90 million
- 14 projects were completed
- Over 300 temporary jobs resulted



Prieska Old Hospital site – before and after

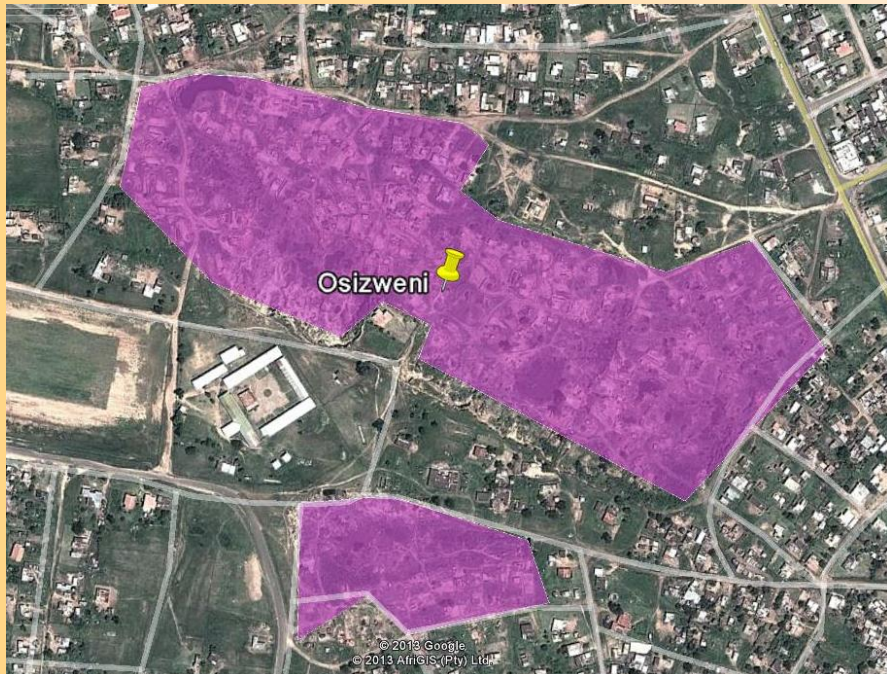
# Continuation of D&O Programme

- DMR and Mintek are finalising a new 3 year agreement, starting 2013/14
- DMR have allocated R165m – the number of projects will depend on the specific sites selected



# Osizweni

- Osizweni has about 20 hectare of exposed coal
- Surrounded by formal and informal housing
- Informal mining is extending towards adjacent school
- Properly managed small scale mining as alternative to closure and rehabilitation will be investigated
- Will be VERY complex and expensive



# ECSP and MTEF allocations to Mintek

R'm'	2012/13	2013/14	2014/15	2015/16	Total
<b>ECSP</b>					
Metal atomising demo plant	15				15
Rare Earth pilot plant	10	15			25
Northern Cape Gem Minerals	10	15	20		45
Mining Effluent Facility		15	10		25
Mintek infrastructure upgrade		15	25		40
Water efficiency*				20	20
Energy efficiency*				20	20
Environmental impact*				15	15
Waste and residue recycling*				15	15
<b>Total ECSP</b>	<b>35</b>	<b>60</b>	<b>55</b>	<b>70</b>	<b>220</b>
<b>MTEF</b>					
SAVMIN acid mine drainage tech	10	20			
Sensor sorting		8	10	15	33
Urban mining		3	15	30	48
Extension of existing projects				12	12
<b>Total MTEF</b>	<b>10</b>	<b>31</b>	<b>25</b>	<b>57</b>	<b>123</b>
<b>Total MTEF + ECSP</b>	<b>45</b>	<b>91</b>	<b>80</b>	<b>127</b>	<b>343</b>

\* Thematic allocations, to be specifically defined over the next two years

# Technology



# Continuous Autoclave Facility

- The new advanced Continuous Autoclave pilot plant has been commissioned.
- Significantly increases capability to treat refractory (i.e. hard to treat) ores.
- Operates at high temperature and pressure and consists of 5 stages.
- First commercial contract signed to conduct pilot testing of a Russian gold ore.



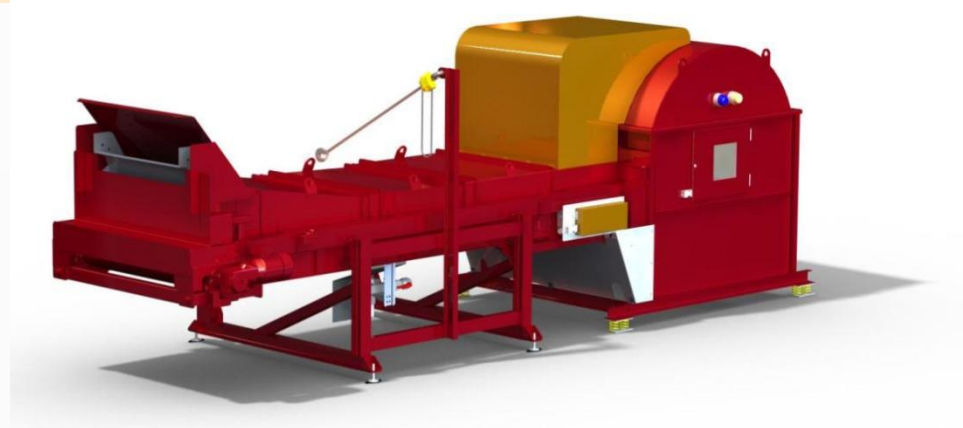
# Precious Metal Smelting / Atomising

- Bay 2 Atomiser plant signed over to Mintek in January
- Will continue to ramp-up production to capacity.



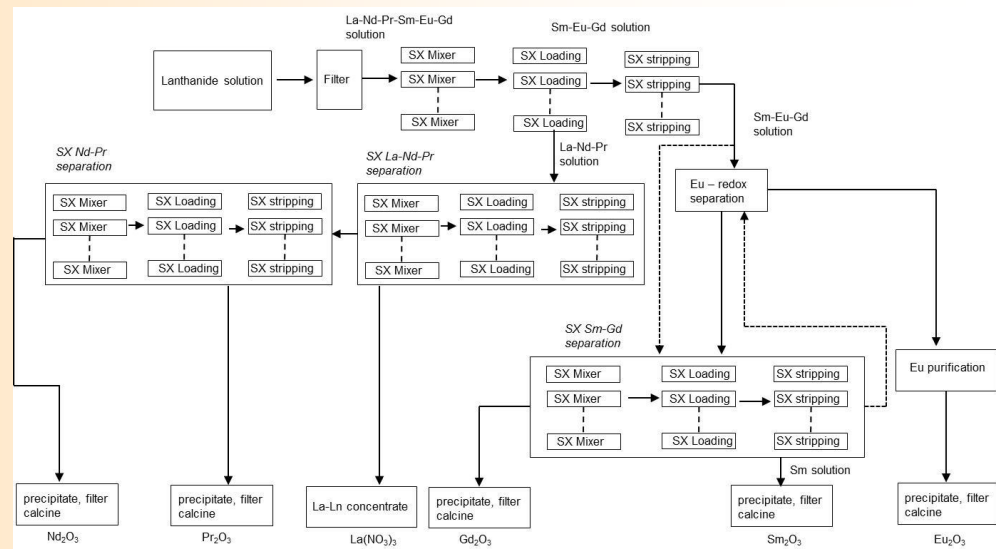
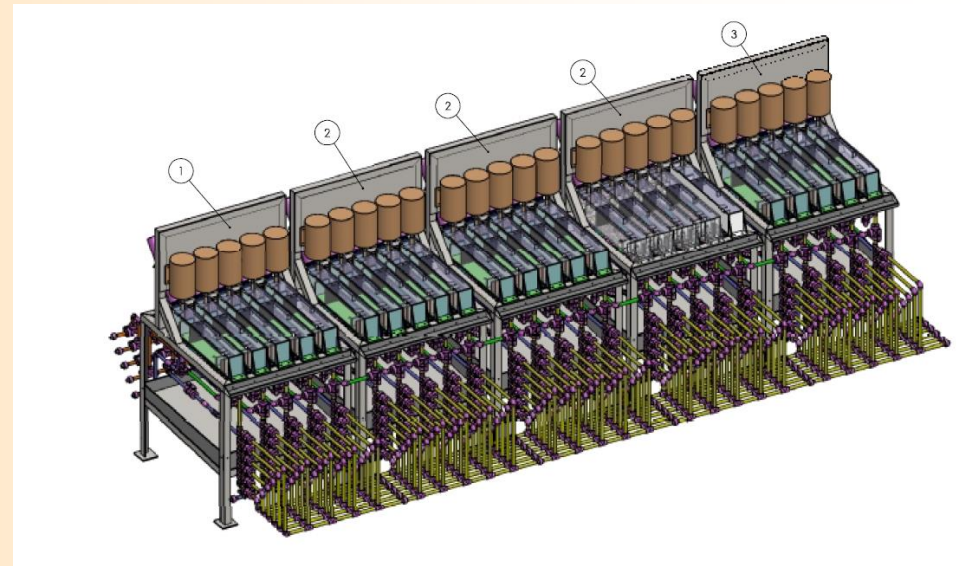
# Advanced Sensor-Based Sorting

- MTEF funded programme to commence in 2013/14.
- Will focus on coal upgrading working with AEMFC.
- Aims
  - Upgrade low grade coal as a feed to Eskom.
  - Scalp off high grade fraction.



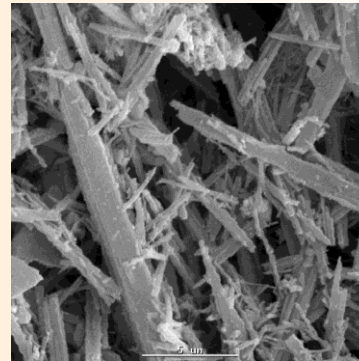
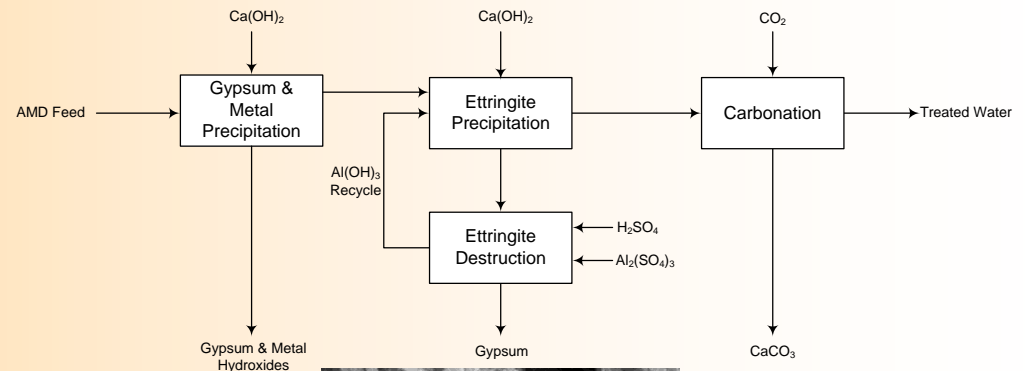
# Rare Earth Element Refinery

- Concept is to create a South African Rare Earth Element refinery.
- Construction of the pilot plant to be completed and plant to be run to prove concept.
- Considerable interest in centralised refinery concept.



# Savmin Water Treatment

- Technology aimed at water treatment, being developed with Veolia.
- MTEF funding of R26m for the development of a pilot plant, to run during 2<sup>nd</sup> half of the year.
- Current assessments suggest that the process is both technical and commercially viable.



# Technology Commercialisation

- Metrix uranium recovery technology being commercialised with Tenova. The sale of the first plant is being negotiated with a foreign buyer.
- IPOC iron exchange resins commercial trials completed and waiting for a decision on commercialisation.

# Research & Development

# Rural communities 2013/14 Plans

- 1 Technology Transfer (Biomin™)
- 4 SMME's started-up
- 60 jobs created from start-ups
- 120 learners trained in small scale mining, pottery, glass beads, jewellery (incl 60 learners from N.Cape in Jewellery, Stone Cutting, Polishing & Setting)





# Rural Communities 2013/14 Plans

- Partnership between Siyathemba Local Municipality + NYDA to set-up Gemstone Beneficiation Incubator in Prieska
- Assist SMME's to ensure at least 73% are still in existence after 2 years



**Simunye Hand Craft & Jewellery, KZN**



**Semi-precious Gemstone Beneficiation Incubator in Prieska**

# 2013/14 MTEF Mine Water/Effluent (BIO)

Enhance mining competitiveness

Eliminate rehab/closure liability by rendering (potentially polluting) effluent harmless prior to disposal



1. Adsorption
2. + Chem/bio oxid./reduction if applicable
3. + Recovery of valuables if applicable

Derive value from existing (polluting) tailings while relocating (both gold and uranium)



Au & U

Safe storage / backfill

# 2013/14 Major Commercial Projects (BIO)

Salamanca, Spain  
(Major U-heap leach)

Tschudi (Namibia)  
& Kipoi (DRC)  
(Major Cu-heap leach  
projects)

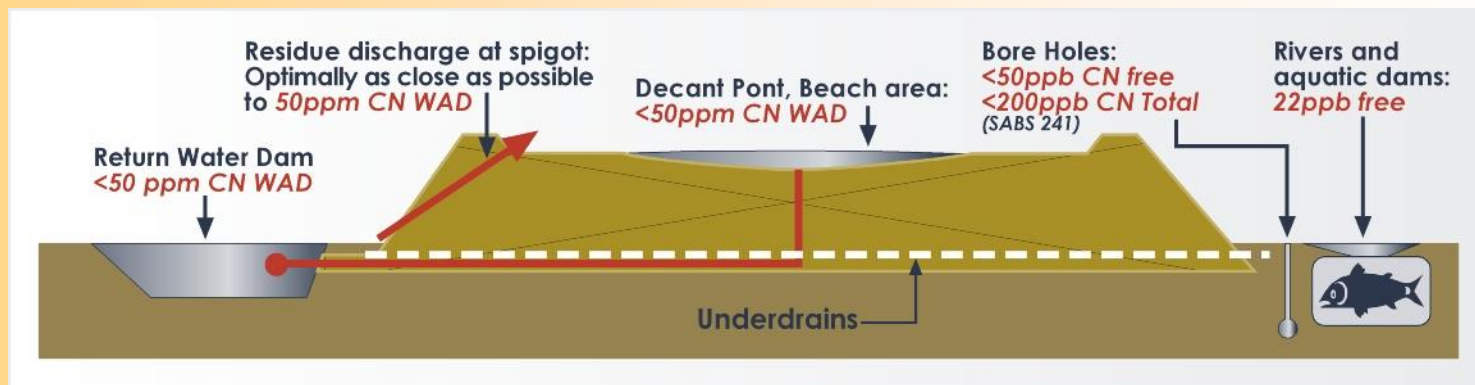


Mondo Minerals, Canada  
(Ni bioleach from talc floats)



# Measurement and Control (MaC)

- MaC develops, demonstrate and implements advanced process control technology
- MaC aims to fully commercialise Xanthoprobe in the next 2 years
- MaC's instruments and control products (FloatStar, MillStar, LeachStar, FurnStar, Minstral & Cynoprobe) are sold locally & internationally
- Matrix Cynoprobe is under the final stages of development (measure cyanide at ppb level)

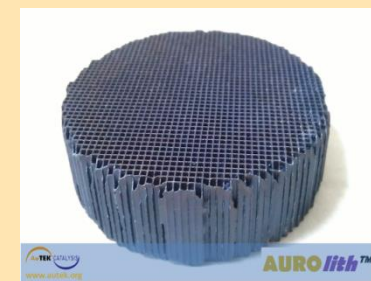
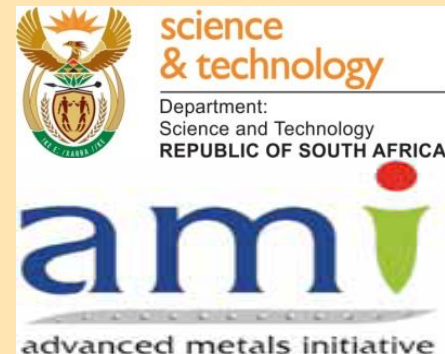


# Advanced Material Division (AMD)

- **Catalysis group will be hosting the 2013 DST-AMI PMDN Conference (14 – 16 October 2013)**

## Products and Services (Catalysis group)

- **Expansion of the sales** of standard **AuroLite™ gold based catalysts**
- Successfully **developed** methods to coat gold catalyst on to ceramic monolith substrates and released the **AuroLith™ range of catalysts**
- **HySA Catalysis Competence Centre** to optimize the performance of **Membrane Electronic Assemblies Fuel Cell Electrodes (MEAs)** based on standard PGM-based catalysts (Pt/C, PtCo/C, PtRu/C)
- Commercialization of the MEA technology with industrial partners
- The commissioning of the **Clean Room Nanoscience and Nanotechnology Laboratory** facilities in July 2013 at Mintek
- To produce developed **prototypes (TB and HIV)** in the World Class clean-room facility at Mintek
- Upscale the pilot production of the **gold nanoparticles** to the **100 Litres** scale for sale to our collaborators and clients
- Establish the peptides synthesis facility (**MINPEPTIDES™**)



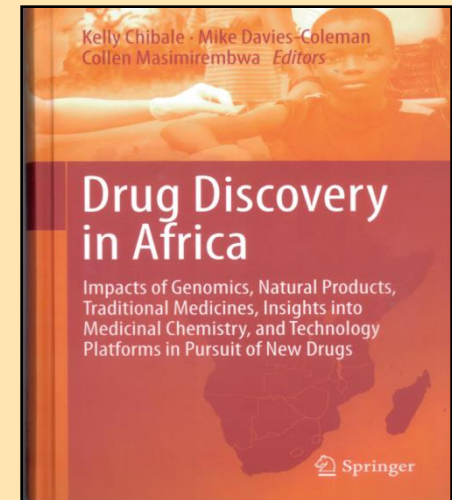
AuroLite™ Gold Catalyst



HIV test prototype

# Advanced Material Division (AMD)

- To increase the R&D outputs of the **DST AMI-FMDN** (Advanced Metals Initiative - Ferrous and Base Metals Development Network)
- To expand the reach and range of the **Metals Technology Centre (MTC)**
- To commission the locally-fabricated **Gas Atomiser** facility for the production of **PGM-based powders**
- The commercialisation of the **TIA-funded Grinding Media** project in partnership with a foundry industry partner
- Full adaption of several biological assays to a **robotic automated platform**
- To continue to streamline and optimise an internal early-stage **drug discovery process** in support of Drug Discovery efforts in Africa
- To finalize a business-plan to start offering **Products** and **Services** from the Biomedical Research Group
- To collaborate with **TIA, Science Councils** and other HEIs towards the establishment of Drug Discovery National Platforms in South Africa



*'Drug Discovery in Africa'*



Figure 3: Photo of the complete system.





**Thank you**