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# **“Opportunities and challenges facing the South African Mining Industry”**

**Presentation to the SACEA AGM**

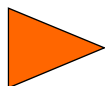
**By Roger Baxter, Senior Executive,  
Chamber of Mines of South Africa,  
17 February 2011**



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## **PRESENTATION OUTLINE**



**Mining and minerals, integral to modern society**

**The global mining industry**

**Back to the “BOOM”**

**RSA Coal Mining Sector**

**The South African Mining Industry**

**The future**

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## Metals and minerals in a Smart Phone



- Copper (16 grams) <sup>1</sup>
- Silver (0.35 grams) <sup>1</sup>
- Gold (0.034 grams) <sup>1</sup>
- Palladium (0.015 grams) <sup>1</sup>
- Platinum (0.00034 grams) <sup>1</sup>
- Ceramic magnetic switches containing rare earths <sup>2</sup>
- Indium<sup>2</sup>
- Titanium dioxide <sup>2</sup>
- Indium tin oxide <sup>2</sup>

<sup>1</sup> source – USGS <http://pubs.usgs.gov/fs/2006/3097/>

<sup>2</sup> source – NRC critical minerals report

## Metals and Minerals in a car



- 960kg iron & steel
- 109kg Aluminum
- 22.7kg Carbon
- 19 kg Copper, 34kg for a hybrid
- 19kg Silicon
- 11 kg Lead
- 10kg Zinc
- 7.7kg manganese
- 6.8kg Chromium
- 4.1kg Nickel
- 0.4 kg Platinum

•+Antimony, barium, beryllium, cobalt, gallium, gold, magnesium, molybdenum, neodymium, indium, palladium, Sulphur, rhodium, silver, strontium, tin, titanium, tungsten, vanadium, zirconium.

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### **Even a Wind Turbine uses a significant amount of metals and minerals**



- 335 tons of steel
  - 4.7 tons of copper
  - 13 tons of fiberglass
  - 3 tons of aluminum
  - 1,200 tons of reinforced concrete
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### **Solar panels need many metals and minerals**



- Lead (batteries)
- Phosphate rock
- Selenium (solar cells)
- Silica (solar cells)
- Tellurium (solar cells)
- Titanium dioxide (solar panels)

- Arsenic (gallium-arsenide semiconductor chips)
  - Bauxite (aluminum)
  - Boron minerals (semiconductor chips)
  - Cadmium (thin film solar cells)
  - Coal (by-product coke is used to make steel)
  - Copper (wiring; thin film solar cells)
  - Gallium (solar cells)
  - Iron ore (steel)
  - Molybdenum (photovoltaic cells)
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## Even a compact fluorescent light bulb is minerals intensive?



- Rare earths
  - Silica (glass)
  - Soda ash (soda-lime glass)
  - Manganese (phosphor)
  - Tin (end caps; filaments; glass coatings)
  - Tungsten (electrodes; filaments)
  - Zinc (end caps; filaments)
  - Barite
  - Bauxite (alumina for phosphor; aluminum for end caps & filaments)
  - Copper (end caps; filaments)
  - Lead (soda-lime glass; ballast; adapter unit)
  - Limestone or dolomite (finely crushed stone to make soda-lime glass)
  - Mercury (vapor in glass tubing)
  - Nickel (end caps; filaments)
  - Phosphate rock (phosphor)
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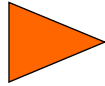
## A bright smile, even comes from mining.....



- Silica
  - Limestone
  - Aluminum
  - Phosphate
  - Fluoride
  - Titanium
  - Mica
  - Petroleum
- 
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Mining and minerals, integral to modern society



The global mining industry

Back to the "BOOM"

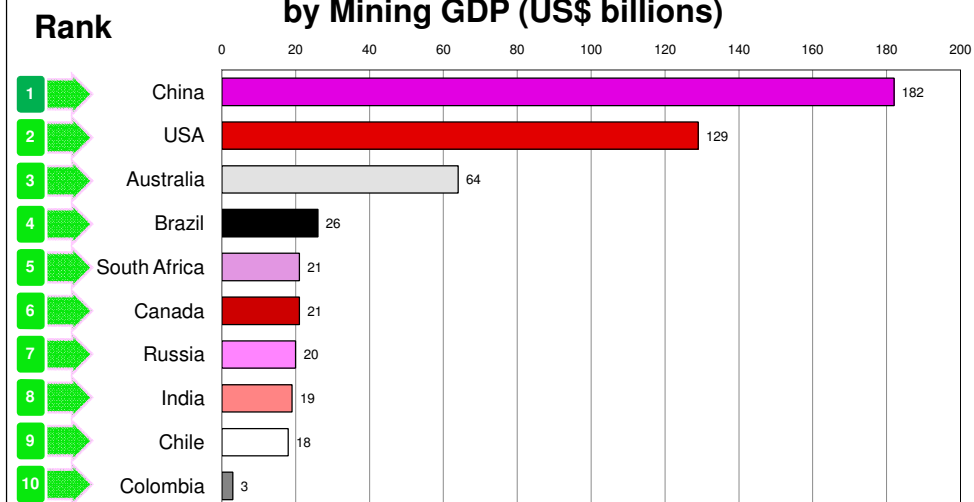
RSA Coal Mining Sector

The South African Mining Industry

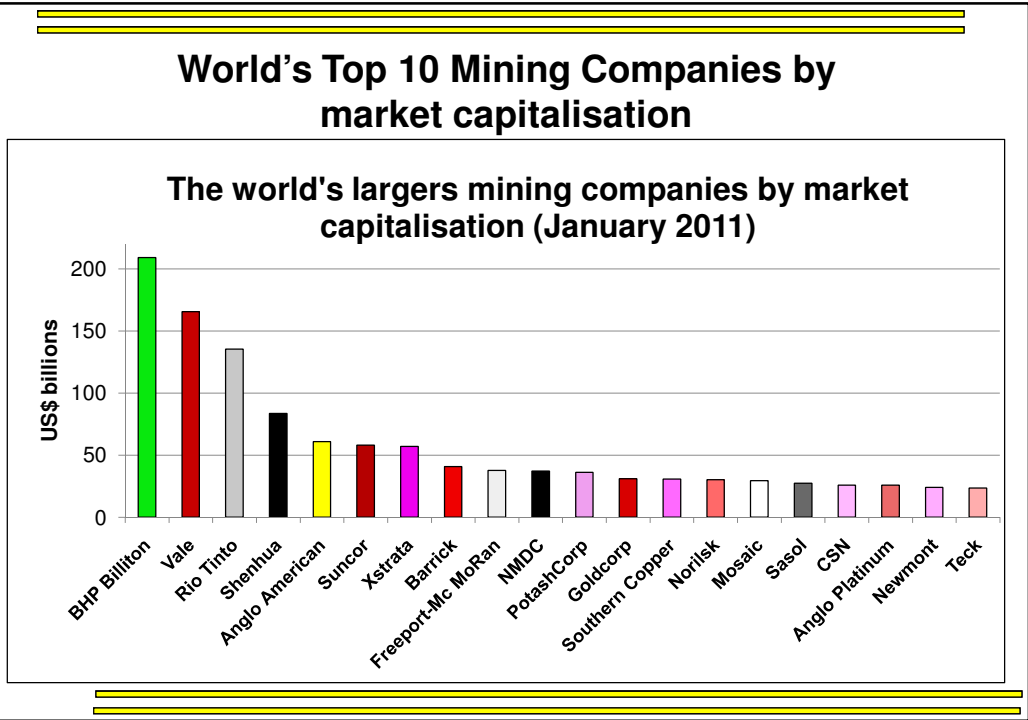
The future

## South Africa has the world's fifth largest mining sector

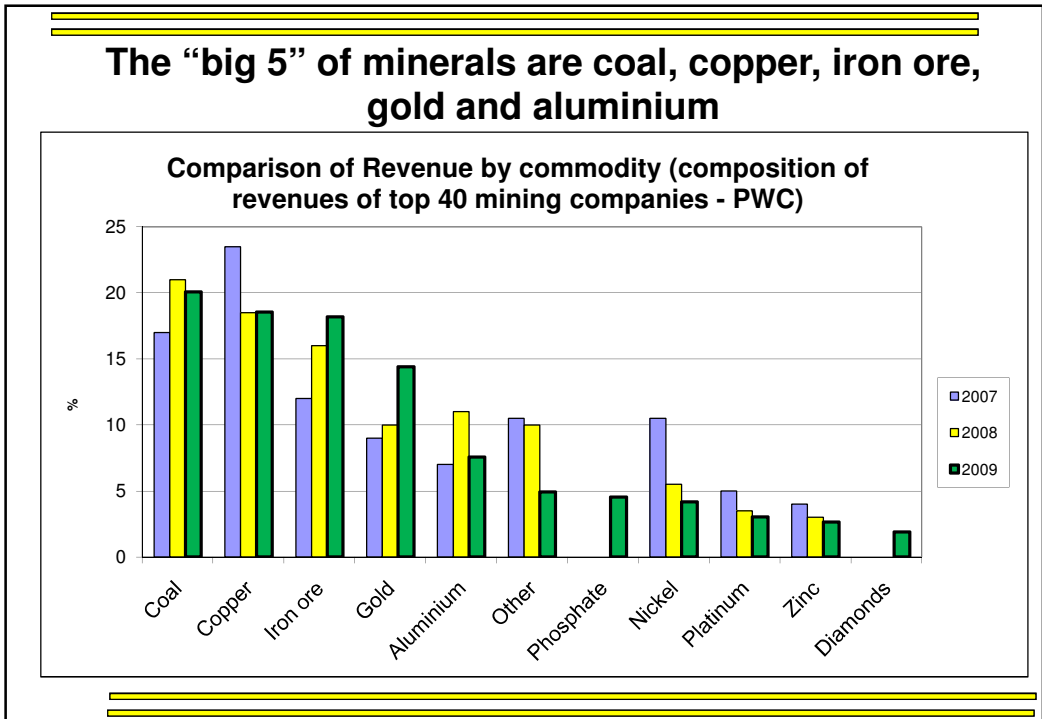
The global top ten mining countries as measured by Mining GDP (US\$ billions)



## World's Top 10 Mining Companies by market capitalisation



## The "big 5" of minerals are coal, copper, iron ore, gold and aluminium



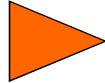
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## Back to the "Boom"

- Global economy is recovering from first global recession in 61 years.
  - Recovery is unevenly distributed, with advanced economies sluggish and developing countries growing strongly.
  - The risks of a "double dip" are fading fast.
  - Mining companies are in better position having repaired balance sheets and sustained core projects.
  - The materials intensive nature of growth in emerging economies will escalate in next decade caused by continued urbanisation and industrialisation.
    - Can South Africa "cash in" on the boom?
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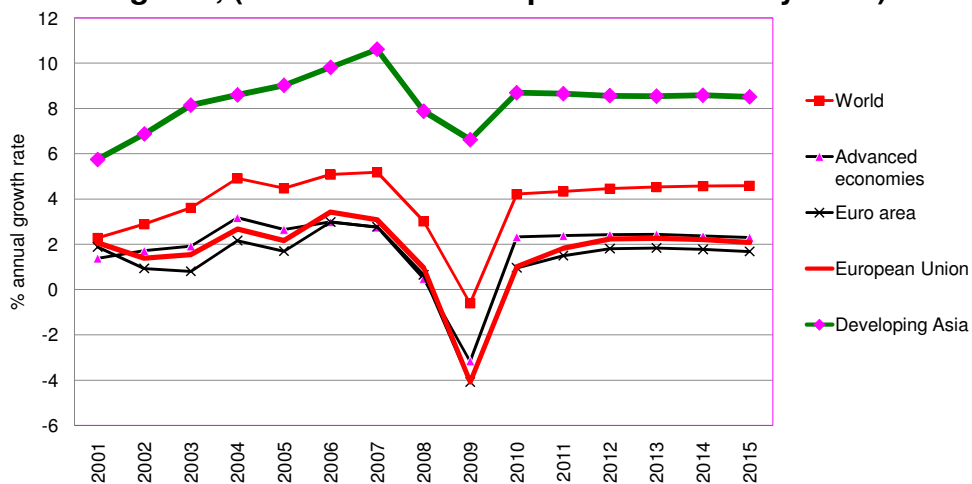
## Back to the “Boom”

### PWC ANNUAL MINING REPORT TITLES

- 2007 “Riding the wave”
- 2008 “as good as it gets”
- 2009 “When the going gets tough”
- **2010 “Back to the Boom”**

## World economy is recovering

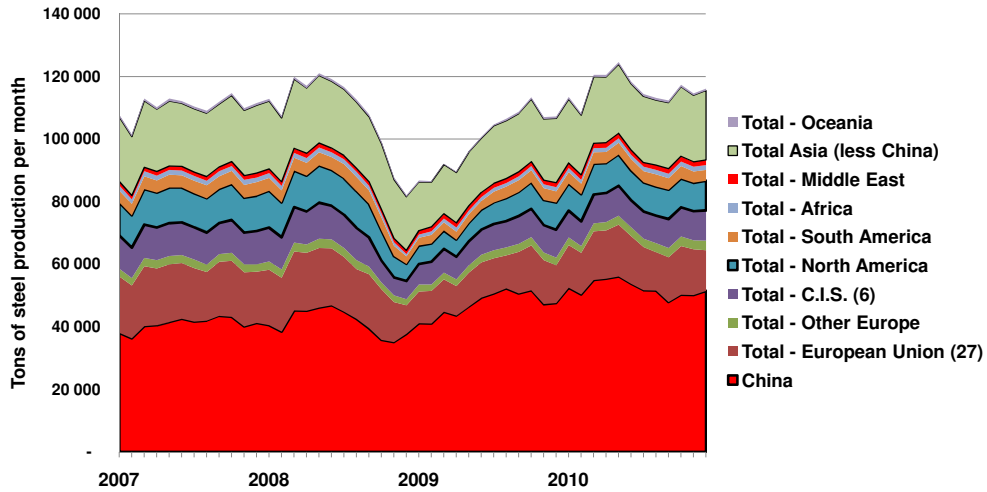
IMF outlook for world economic growth for key regions, (source IMF WEO April 2010 and July 2010)





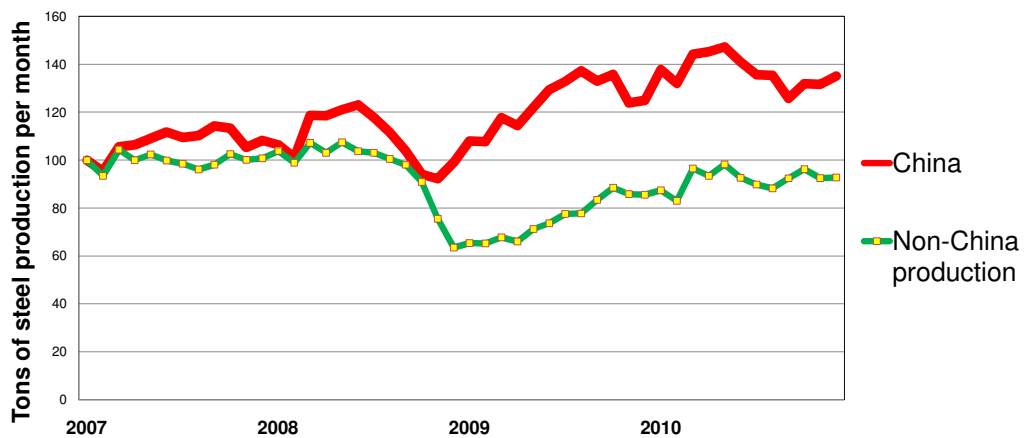
## World economy is recovering

Global steel production has recovered to pre-crisis levels  
(source: IISI)



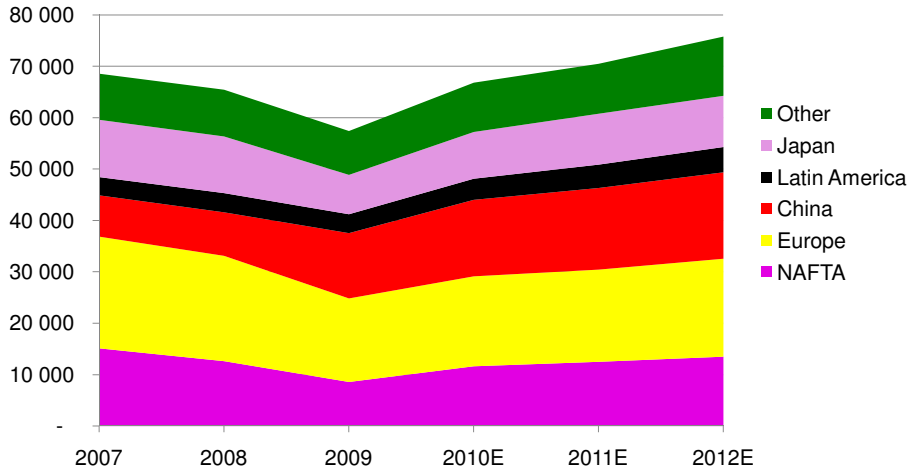
## World economy is recovering, but the recovery is unevenly distributed

Global steel production has recovered to pre-crisis levels  
(source: IISI)



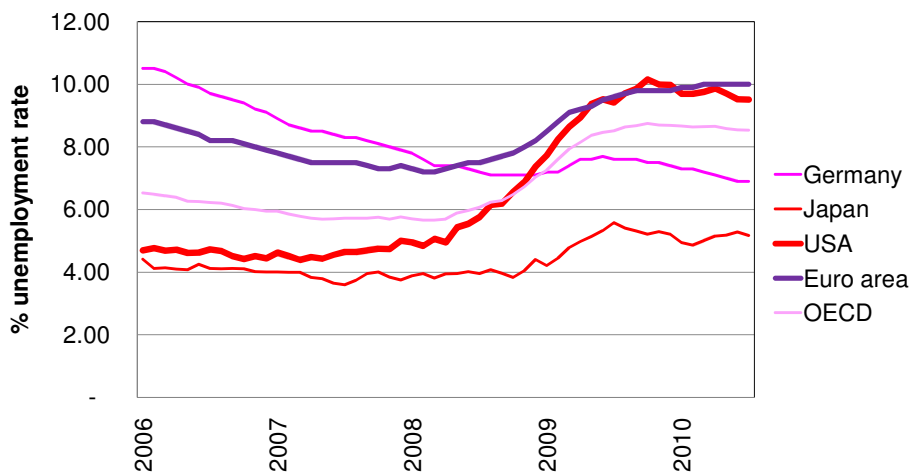
## World economy is recovering

Global automotive production by key region/country, (source: CSM and JDPowers)

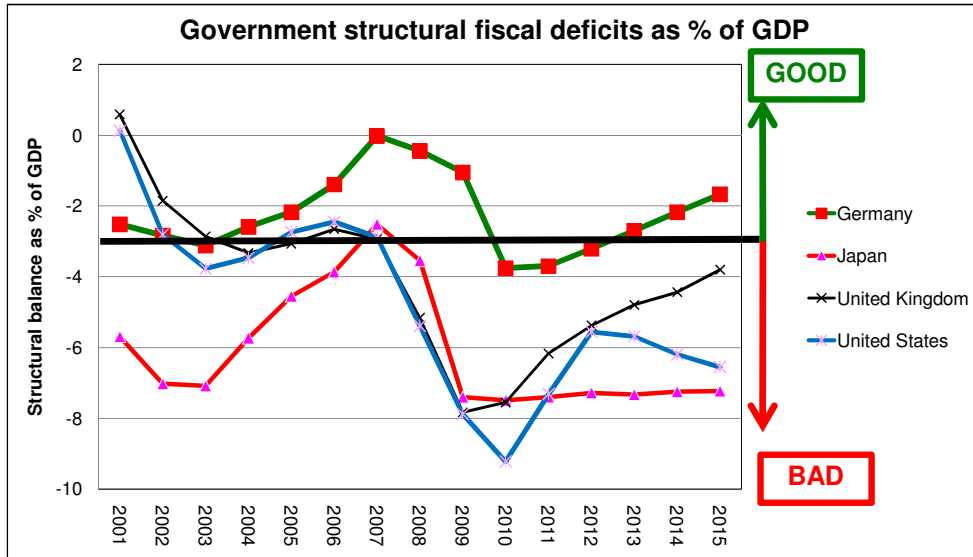


## Risks remain.....

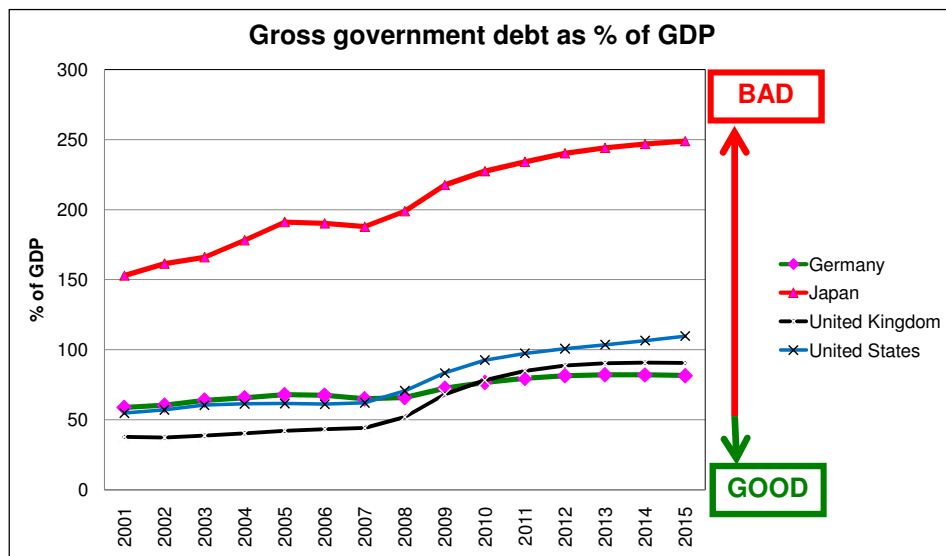
Unemployment rates in the industrialised countries (source: OECD)



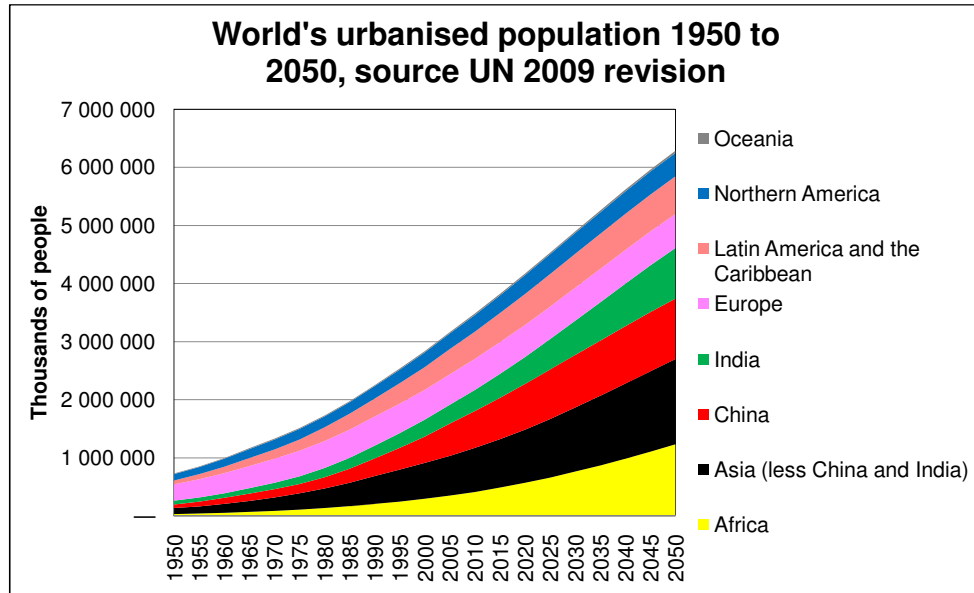
## Risks remain.....



## Risks remain.....



## Back to the Boom.....



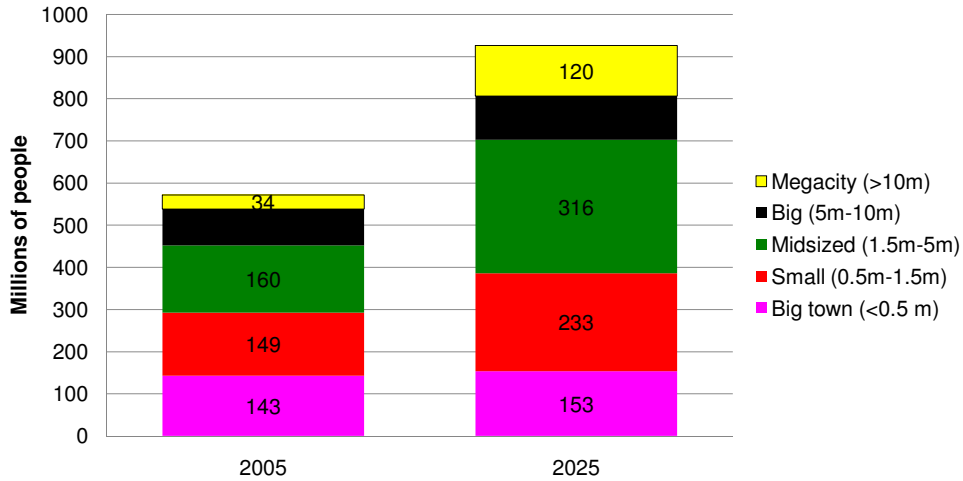
## The Global Commodities Boom

### •Further facts on China:

- 700 000 Engineers graduate annually in China
- 650 million cell phones in circulation in China
- Currently has 160 cities with >1million people (vs 9 in USA)
- 257 new cities expected to be built by 2025
- 500 new coal fired power plants to be built in next decade
- 97 new airports to be built in next 12 years
- 50% of the world's cement production in 2008 from China
- 50% of world's steel produced by China in June 2009
- 34% of world's aluminium production in 2008
- 33% of globes titanium sponge & pigment production

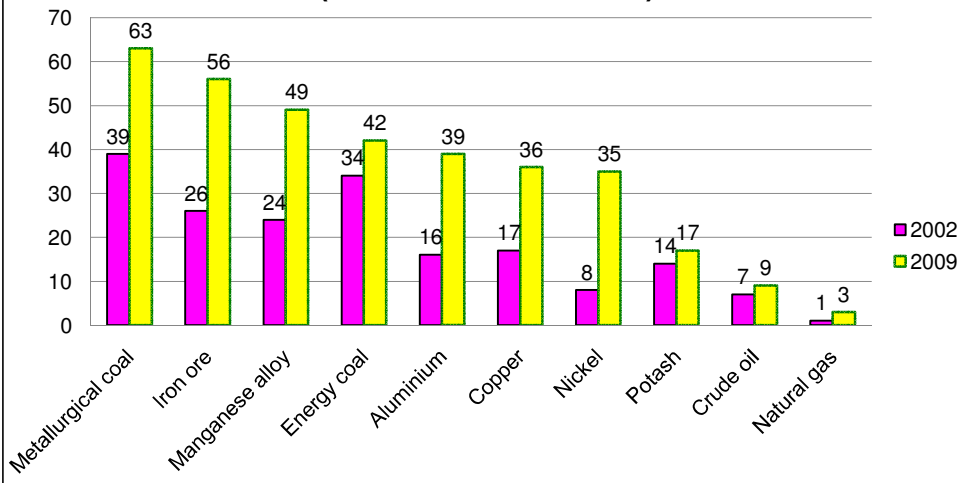
## Back to the Boom.....

China's urban population to reach 1 billion by 2025 (source McKinsey)

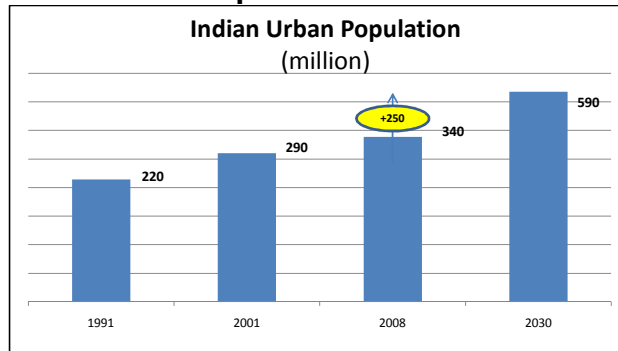


## Back to the Boom.....

China's share of global commodity demand (source: BHP Billiton)



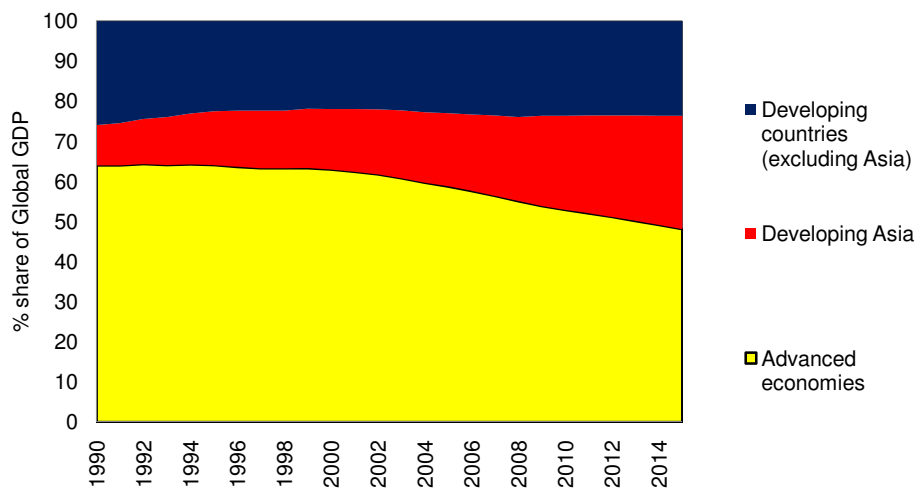
**And India is gaining its own growth and developmental momentum**



Total Indian Population (million)	856	1040	1155	1470
Indian Population Urbanised (%)	26%	28%	30%	40%
Average Global Urbanisation (%)	43%	47%	50%	59%

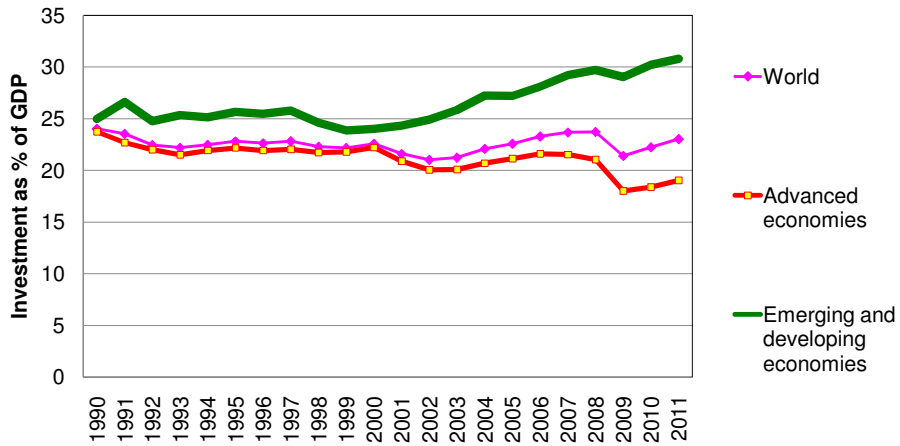
**Back to the Boom.....**

**Composition of Global GDP, PPP basis, (IMF WEO April 2010)**



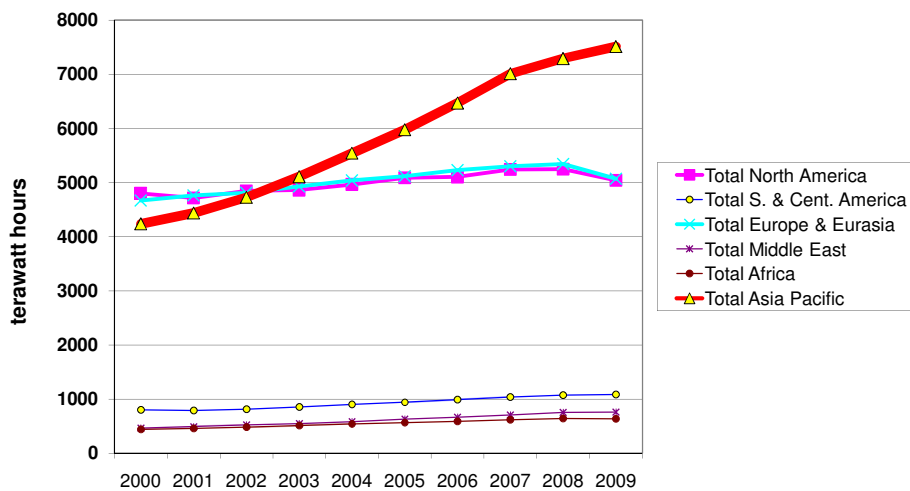
## Back to the Boom.....

World investment trends, GFCF as % of GDP- (IMF WEO April 2010)



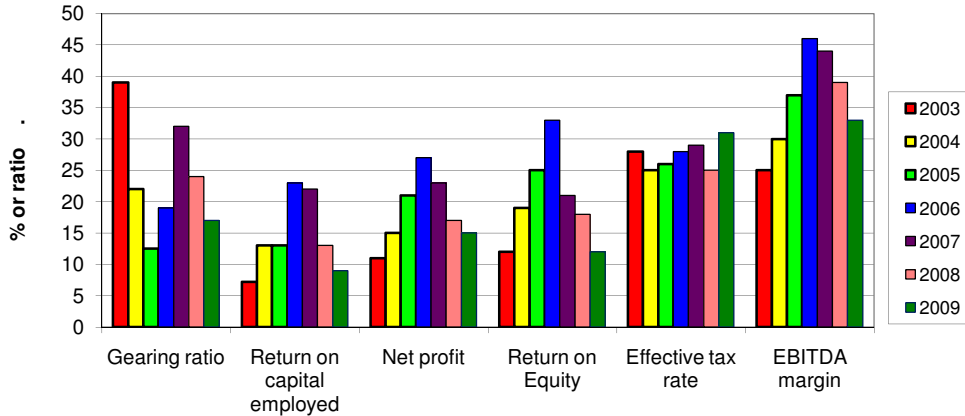
## Back to the Boom: China is building 2 X Eskom p.a.

Electricity generation per region



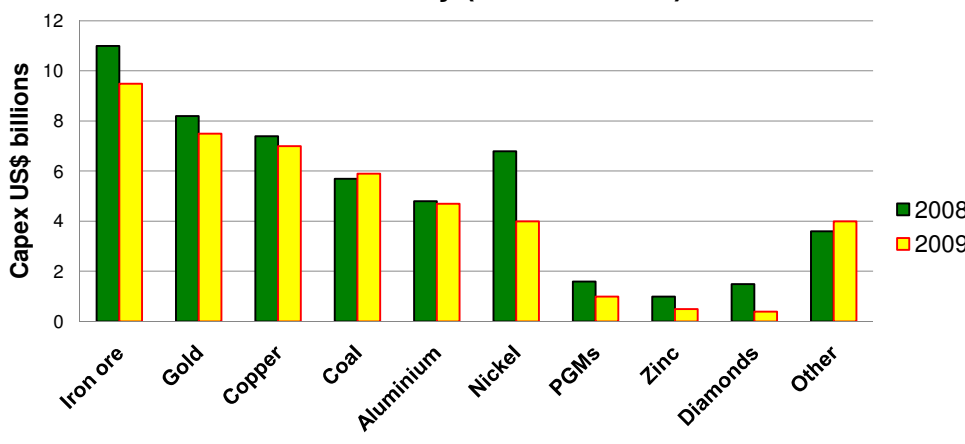
**Mining companies have restructured balance sheets and are ready to grow.....**

**PWC Survey of top 40 mining companies "Mine: Back to the Boom" key indicators, 2009**



**Mining companies have sustained investment in core LT projects related to commodity boom.....**

**Capital investment by top 40 mining companies by commodity (source: PWC)**





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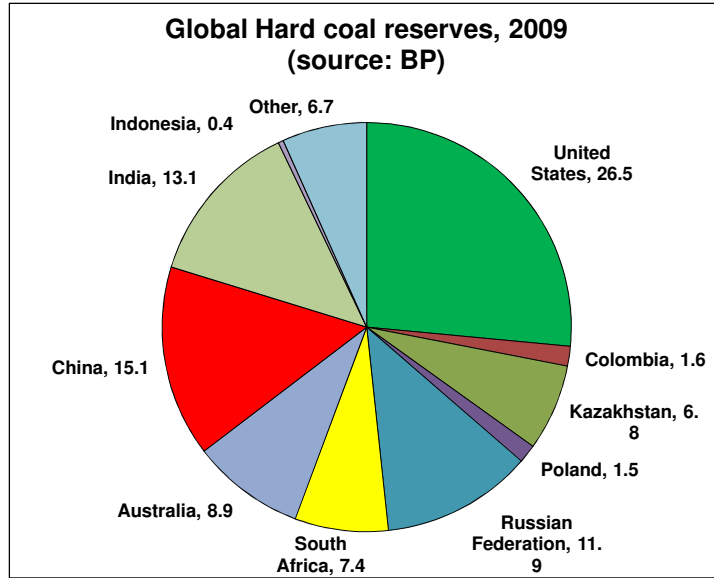
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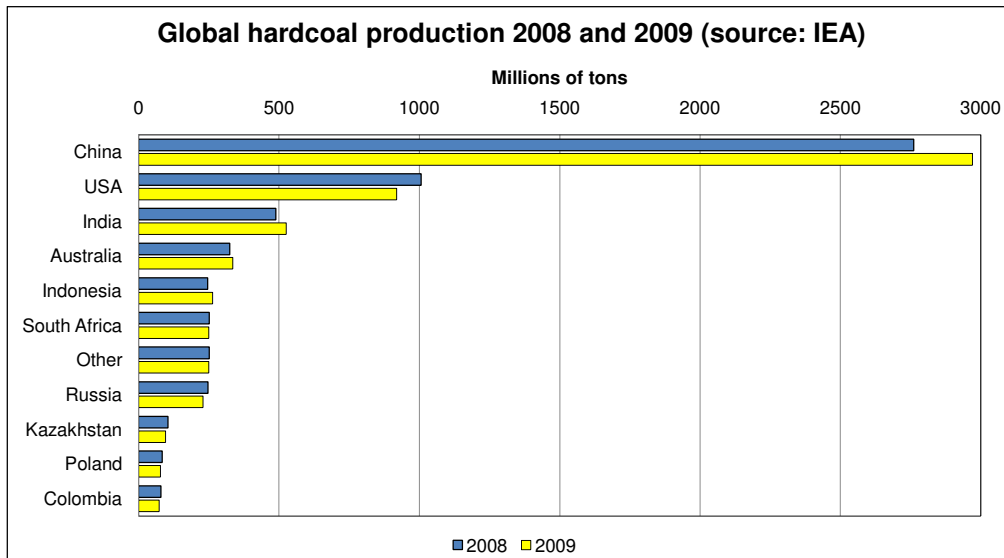
## Coal, key issues:

- 254.7 MT local production, R69 billion in sales in 2010.
  - Only 65.7mt exported in 2010 vs >70mt target.
  - Rail constraints big challenge.
  - RSA needs extra 100MT of coal production by 2020, +/- 75 MT for electricity generation and 25 MT for exports.
  - All coal fields require substantial new investment just to sustain production +/- R100 billion in investment required.
  - Unhelpful public debate on coal quality – only 2 collieries had problems and these have been resolved through new contracts.
  - Perception that coal mining companies are exporting "Eskom quality" coals to India is again sensationalist.
  - Perhaps biggest challenge is to engage effectively in the debates about Climate Change and carbon taxes.
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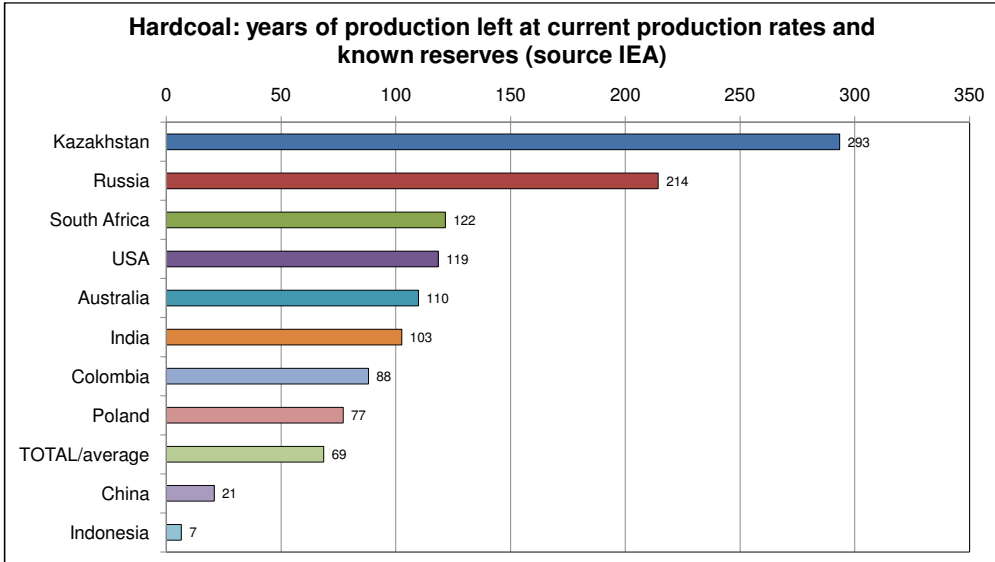
## South Africa has the 6<sup>th</sup> largest reserves of hard coal



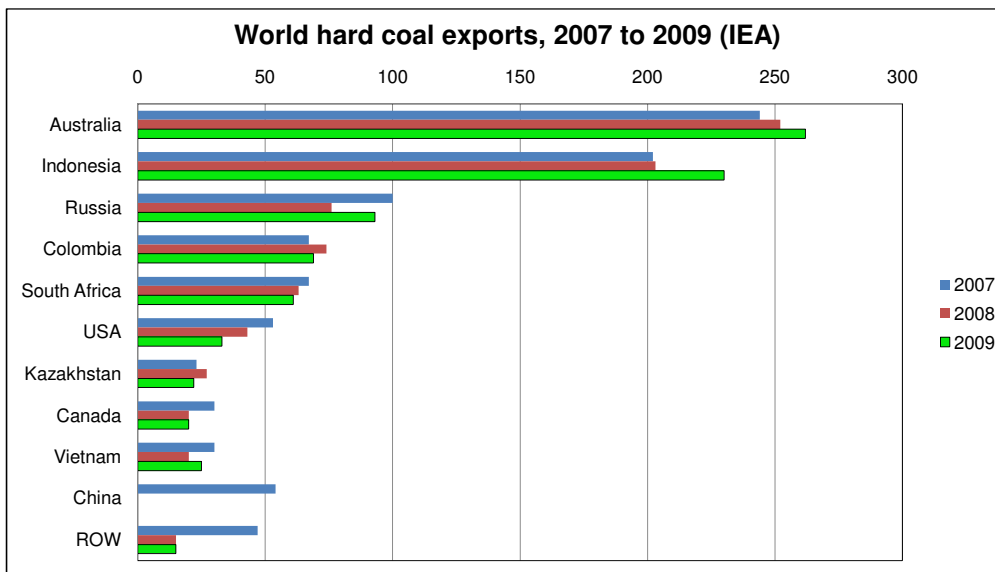
## South Africa is the 6<sup>th</sup> largest hardcoal producer



## South Africa still has enough reserves to support production

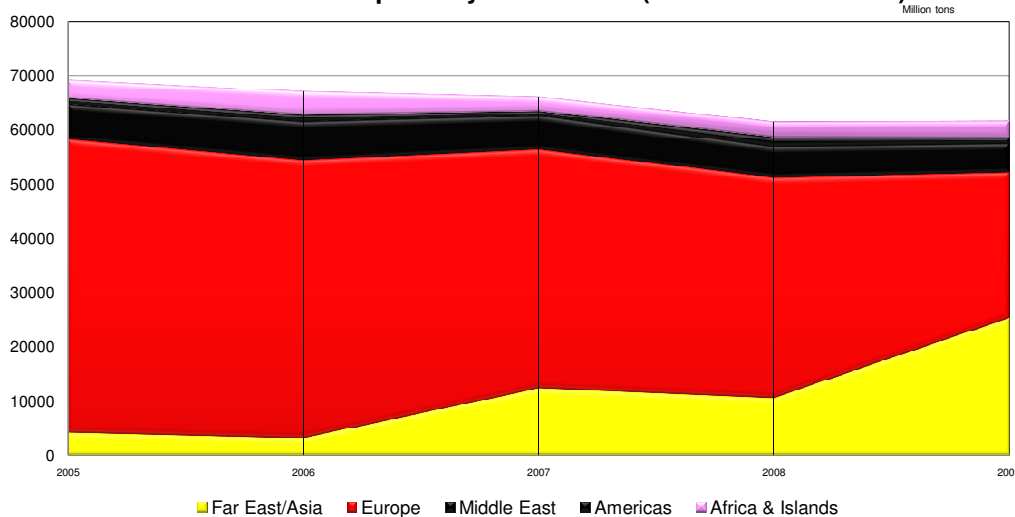


## South Africa remains the 5<sup>th</sup> largest exporter



## There is a shift of SA coal exports from EU to Asia

SA Thermal Coal Exports by Destination (Source: SACR 2009)

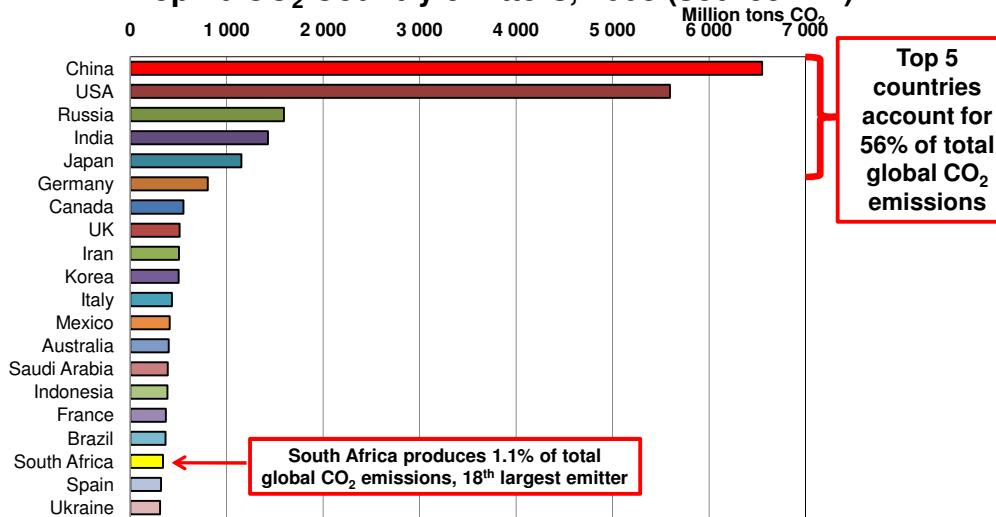


## Climate change is a big issue for the global coal industry

- RSA government has released a Green Paper on SA response to GCC and Treasury a paper on Carbon Taxes.
- At global level SA accounts for 1.1% of global GHG emissions.
- In RSA coal generates 94% of electricity, 30% of liquid fuels and accounts for 70% of GHG emissions.
- COM strong emphasis on practical realities of energy supply, the need for energy security, the risks of being first mover and ensuring global agreement is achieved.
- RSA must also meet its own growth objectives.
- Coal has a significant future role in primary energy supply, but focus must be on clean technologies and carbon capture and storage.

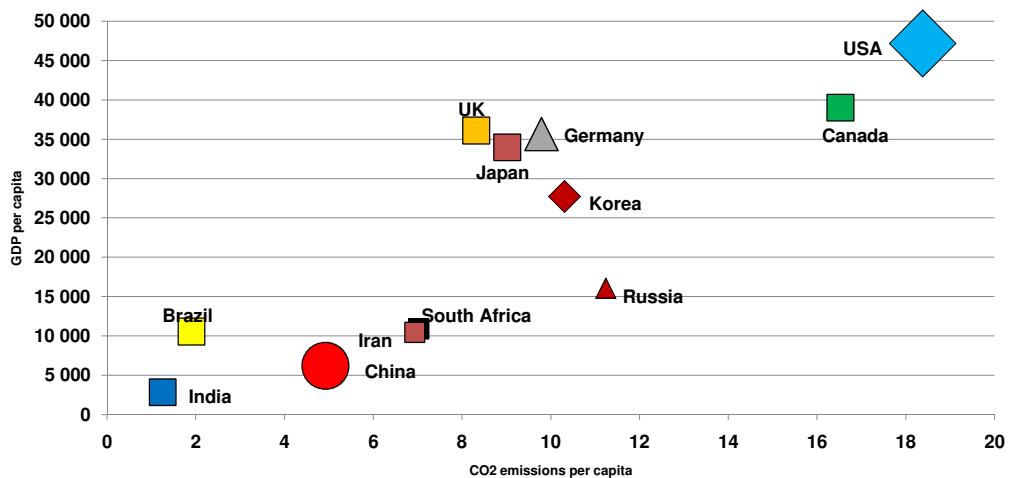
## Top 5 CO<sub>2</sub> emitters account for 56% of global total

Top 20 CO<sub>2</sub> Country emitters, 2008 (source IEA)



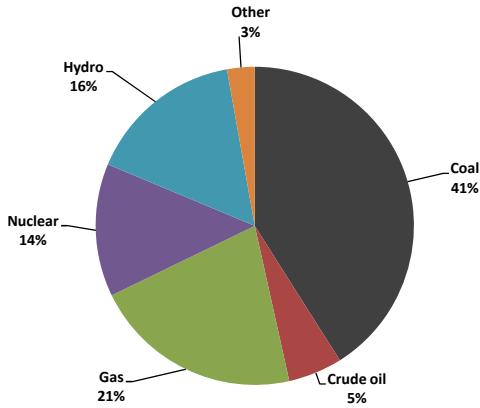
## Strong correlation between GDP/capita and CO<sub>2</sub>/capita

Emissions per capita versus GDP per capita (PPP basis), source: IEA/IMF

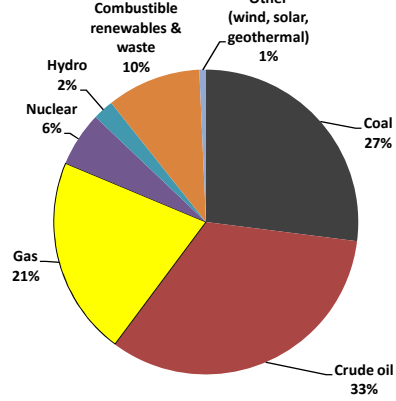


## Coal remains important to global energy supply, and will remain important in the future.....

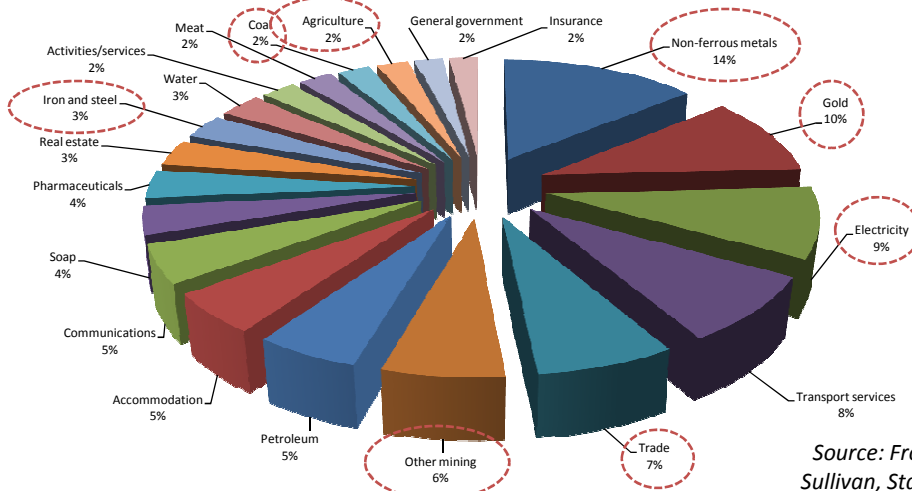
**Electricity generation by fuel: 2008 (IEA)**



**Primary energy supply by source: 2008 (IEA)**



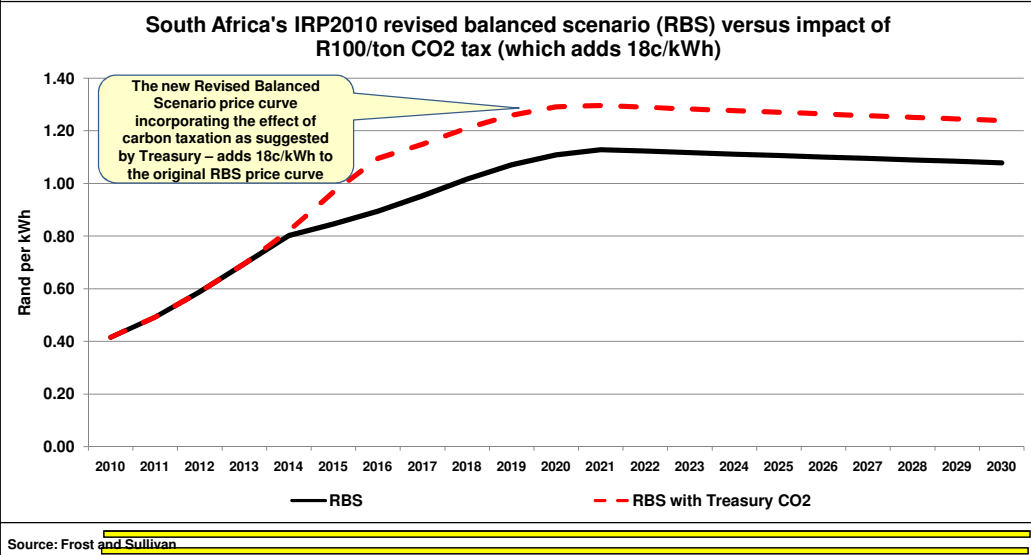
## South Africa's electricity demand will grow as energy intensive sectors grow over the next decade



Source: Frost & Sullivan, StatsSA

**Almost 50% of total electricity usage comes from sectors that are either targeted by IPAP and the New Growth Path, or are most likely to contribute to growth in employment. Currently these sectors also facilitate the majority of our export revenue and are crucial to the maintenance of the tertiary sectors contribution to the economy.**

**The Treasury proposed CO2 tax, if a R100/ton CO2 is added up to 2020 & then R200/ton CO2 for 2020 to 2040, will add 18c/kWh to the electricity price**



**Practical realities facing South Africa**

- Country is semi-arid, so limited hydro potential.
- Country faces food security risks if biofuel is pushed.
- Nuclear is very expensive from a capital cost point of view.
- Solar plant are useful but small (max concentrating solar plant is about 250 MW).
- Wind power is small in the grand scheme of things:
  - To replace on 3000MW coal fired plant would require 15000MW equivalent of wind to be installed (20% energy availability factor)
  - Would require 7500 X 2MW wind turbines to be installed.
  - That is 1 wind turbine installed every 240 meters between Durban and Cape Town!!

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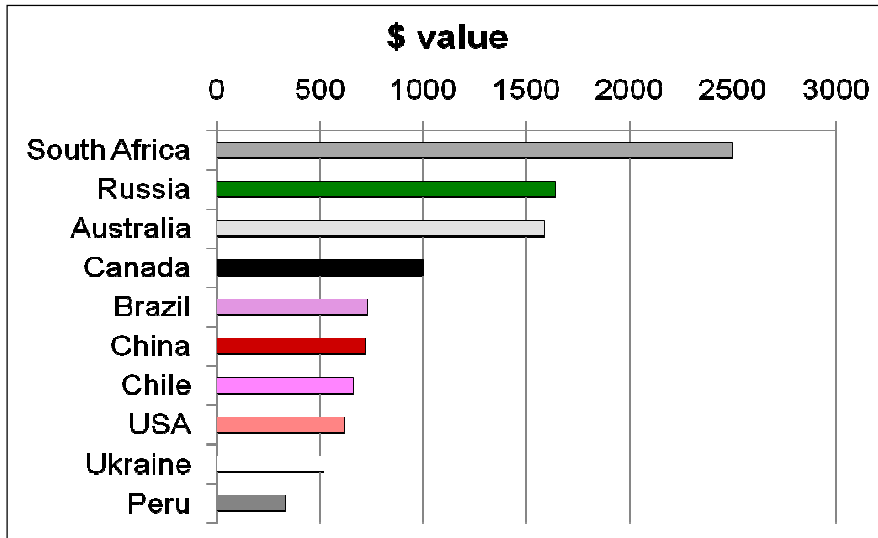
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## Mining - The Essential Core Of SA Economy

- Creates 1 million jobs (500 000 direct & 500 000 indirect).
  - Accounts for about 18% of GDP (8% direct, 10% indirect & induced).
  - Critical earner of foreign exchange >50%.
  - Accounts for 18% of investment (9% direct).
  - Attracts significant foreign savings (>30% of value of JSE).
  - 18.5% of corporate tax receipts (2007 R22 billion, 2008 R33 billion, 2009 R11 billion)
  - 50% of volume of Transnet's rail and ports
  - 93% of electricity generation via coal power plants
  - 15% of electricity demand
  - About 37% of country's of liquid fuels via coal (R30 billion worth)
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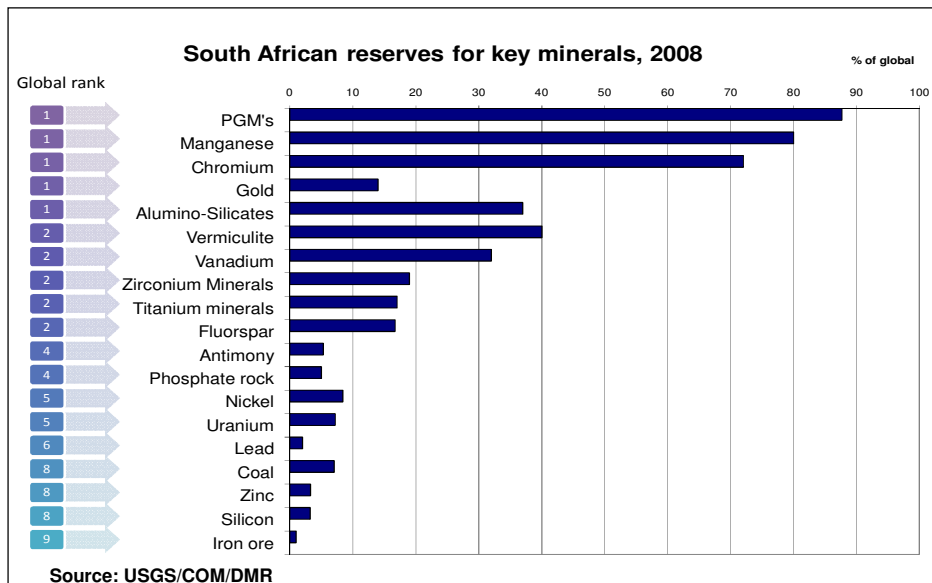


Recent Citibank research note rates South Africa as the richest “in situ” mineral *resource* holder in the world:



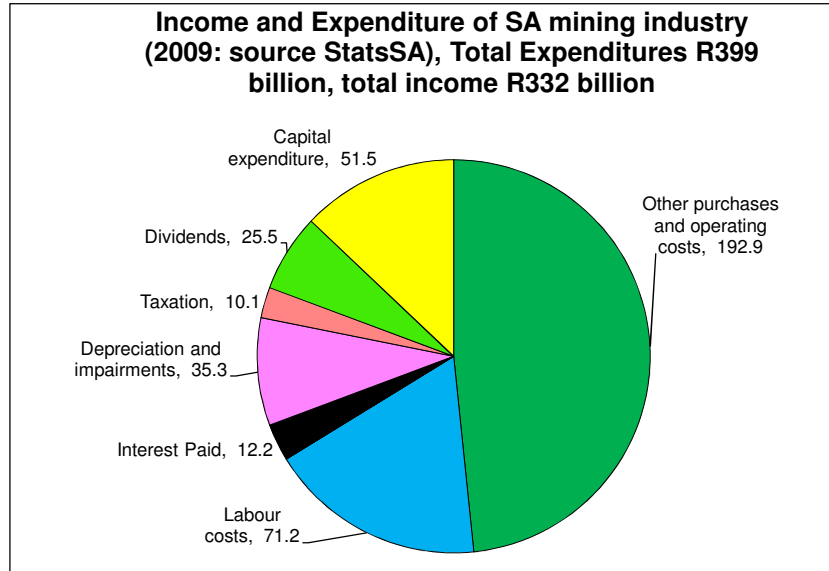
Source: Citibank

SA has significant geological prospects.....



Source: USGS/COM/DMR

**A large share of the industry's expenditures are captured locally**

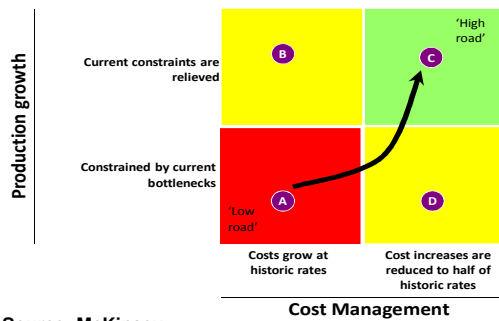


Source: StatsSA

**I.E. THE BENEFITS OF SOUTH AFRICAN MINING ARE MOSTLY CAPTURED LOCALLY!!**

**A “high road” is very possible for South Africa’s mining industry.....**

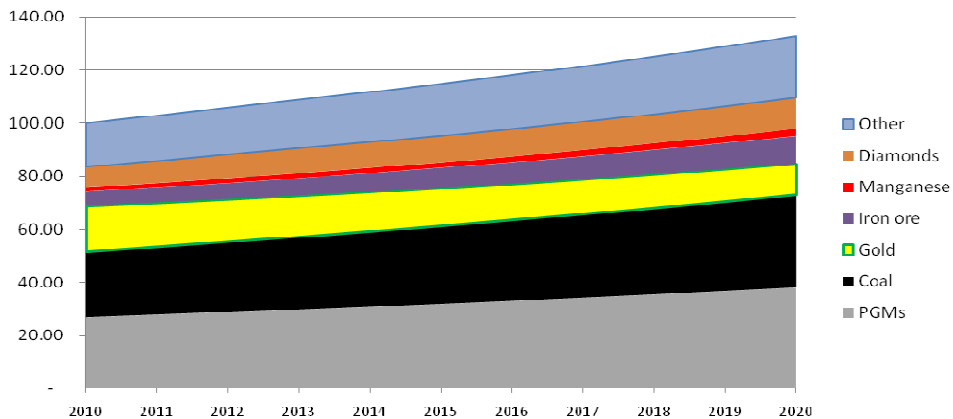
**Two scenarios were developed for the forward looking scenarios**



Source: McKinsey

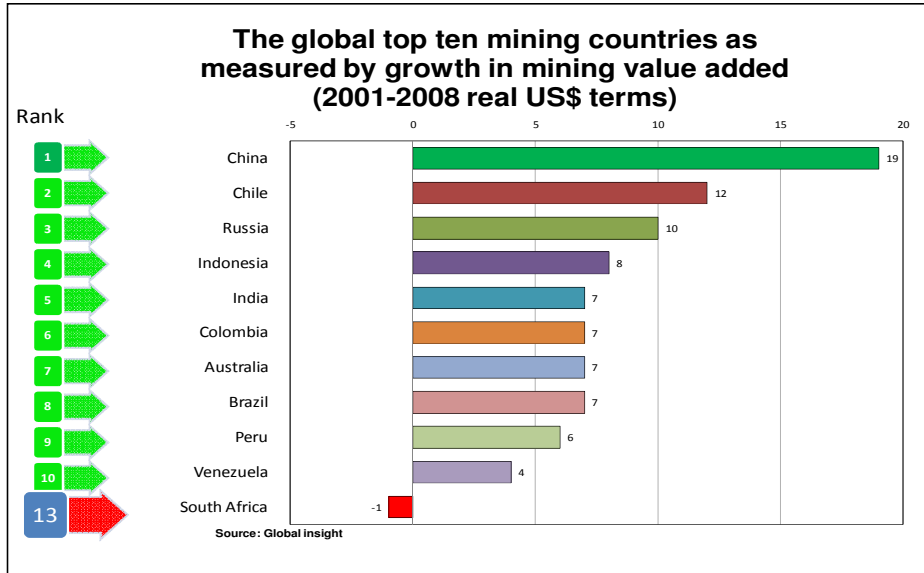
**For period 2010 to 2020, conservative modeling indicates that a 3.9% growth rate for the non-gold mining sector is realistically possible, with another >100 000 jobs possible.....**

**Projected trends in the mineral weighted production profile of the RSA mining sector, 2010 to 2020**



Source: COM/MIGDETT

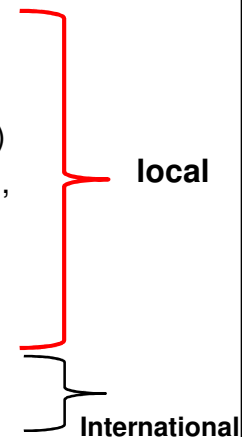
**However, during the past commodity boom South African mining performed poorly versus its peers.....**



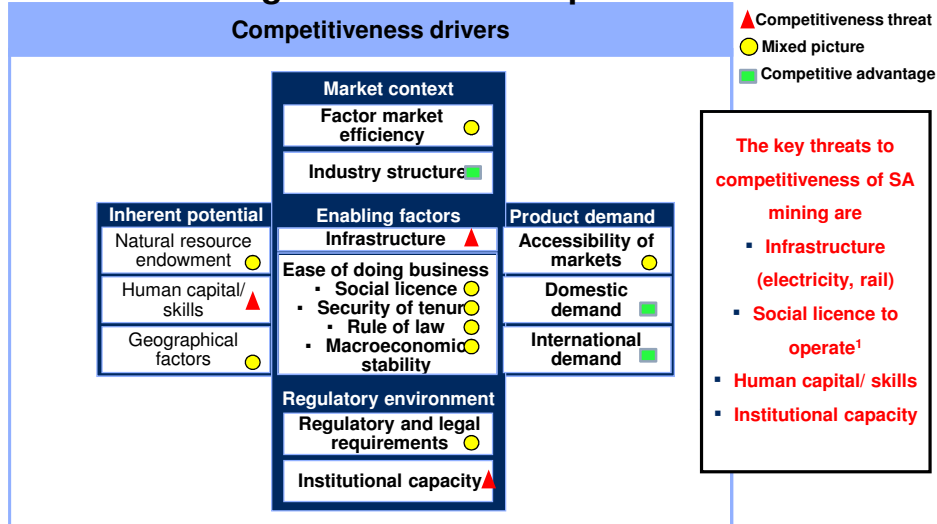
**South Africa was unable to take advantage during the commodity boom mostly due to domestic issues**

- **Mining production declined in period 2006 to 2008, despite significant increase in investment in that period.**

- Binding infrastructure constraints (electricity, rail,)
- Red tape constraints (e.g. water licenses)
- Policy uncertainty (changing the rules of the game)
- Mine closures for safety related issues (some valid, some not) –s54's
- Human capital constraints
- Stagnant productivity and rapidly escalating costs
- Volatility in rand-dollar exchange rate
- Then the global crisis hit



## The lack of growth is due to a combination of drivers eroding the sector's competitiveness



<sup>1</sup> Dealt primarily in sustainability and transformation workstreams  
 SOURCE: McKinsey & Company

## Mining Industry Growth, Development And Employment Task-team (MIGDETT)

- Tripartite, leadership driven. Setup in December 2008.
- Long term issues (repositioning the industry for growth):
  - Must get infrastructure right for the next boom
  - Address longer term regulatory constraints
  - Develop sufficient human capital to enable the sector to grow in future
  - Move to “SA Inc” approach
  - **WORK IN PROGRESS**

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## **Agreement by tripartite leadership to develop “Strategy For Sustainable Growth And Meaningful Transformation Of The South African Mining Sector”**

- **To be developed by tripartite under auspices of MIGDETT**
    - Competitiveness task team
    - Transformation task team
  - **Mining Charter review part of the process**
  - **Strategy document debated at Mining Summit in late March**
  - **Final declaration signed 30 June 2010**
  - **Revised Mining Charter released in September**
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## **Proposals to help SA Mining Industry Back on to Growth Trajectory**

- **Substantive tripartite declaration on 13 topics signed on 30 June:**
    1. Promoting growth and transformation
    2. Infrastructure
    3. Innovation, productivity and cost competitiveness
    4. Sustainable development in mining
    5. Beneficiation
    6. Regulatory framework
    7. Human resource development
    8. Employment equity
    9. Mine community development
    10. Housing and living conditions
    11. Procurement
    12. Ownership and funding
    13. Monitoring and funding
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## Substantial work is being done to get the “rubber” to “hit the tarmac”

- The regulatory task team is discussing amendments to MPRDA.
  - There is a review in DMR of problems on licenses.
  - The infrastructure task team is working on a matrix of infrastructure constraints per commodity.
  - Industry is cooperating with government on wide range of areas to promote competitiveness and growth.
  - The future is in our hands.....
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**Mining is now back on top 5 priority sector list of government (MIGDETT has played large role)**

- All government Ministers need to indicate in their plans and performance agreements how they are going to assist the priority sectors.
  - Government is increasingly recognising the important role that mining does play and can play.
  - Government has recognised that the exchange rate is too strong.
  - Mining has the opportunity to turn around its recent slow growth performance.
  - The future is in our hands.....
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**MINING AND MINERALS MATTER FOR  
THE GROWTH, DEVELOPMENT AND  
TRANSFORMATION OF  
SOUTH AFRICA**

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