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## International trade – what lies in store for global hard coal trade & what fundamentals will drive developments?

# SOUTH AFRICA

IEA workshop  
**OUTLOOK FOR COAL MARKETS**  
 Oriental Bay International Hotel, Beijing, P.R. China, 14 April 2011

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## COAL: KEY TO SOUTH AFRICA'S ECONOMY

In 2010, South Africa's saleable coal production was 255Mt

- Coal is one of the top 2 components of the SA mining industry

### SA mining industry:

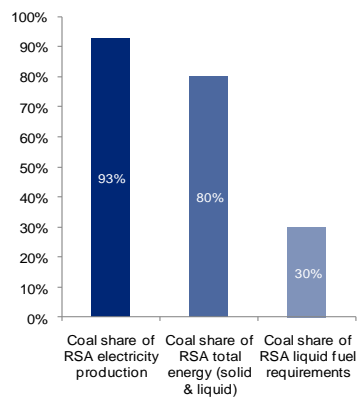
#### Top 3 commodities by sales value

ZAR billions*	Coal	Platinum	Gold
2009	65.3	58.0	49.0
2010	69.5	73.8	53.1

(\* US\$1 approximately ZAR7)

- The industry provides some ~ 80% of South Africa's total primary energy requirements & is core to economic development:
  - 92.8% of South Africa's electricity production...
  - & ~30% of SA's total liquid fuel requirements
- Coal exports accounted for 26.2% of total coal production - 5.7% or R35.4 billion of total merchandise exports in 2010
- Coal employs some 73,618 people & paid ZAR14.1 billion in wages
- Open coal market: commercial sales agreements between producers & buyers – both for domestic and export-quality coal**

Coal industry key statistics (%)



Source: South African Chamber of Mines

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## SOUTH AFRICA'S COAL RESOURCES

### South Africa holds significant coal resources

- No authoritative resource estimate carried out since De Jager et al (1982) determined "in-situ mineable resource" of 114,870M metric tonnes
- "Recoverable reserves" were estimated at 59,241Mt
- Prevost et al of the Minerals Bureau (prev. Department of Minerals & Energy) adjusted this to 33,118Mt in 2009
- SA Council for Geosciences (sponsored by Eskom) currently completing a revised Resources & Reserves statement – expected end-2011
- Nevertheless, considerable exportable tonnages remain, with some unconstrained planning scenarios indicating significantly increased exports up to 2040

### South African reserves by coalfield – 2009<sup>(1)</sup>

Coalfield	Recoverable (Mt)	%
Waterberg	6,744	20.4
Witbank	8,509	25.7
Highveld	9,475	28.6
Free State	-	-
Ermelo	4,388	13.2
V-Sasolburg	1,708	5.2
Springbok Flats	-	-
South Rand	716	2.2
Utrecht	541	1.6
Klip River	529	1.6
Vryheid	100	0.3
Kangwane	146	0.4
Nongoma	6	0.0
Soutpansberg	257	0.8
<b>GRAND TOTAL</b>	<b>33,118</b>	<b>100</b>

Source: Based on the de Jager Report, adjusted for mined tonnage, updated for Waterberg & other known data – Prevost, 2009

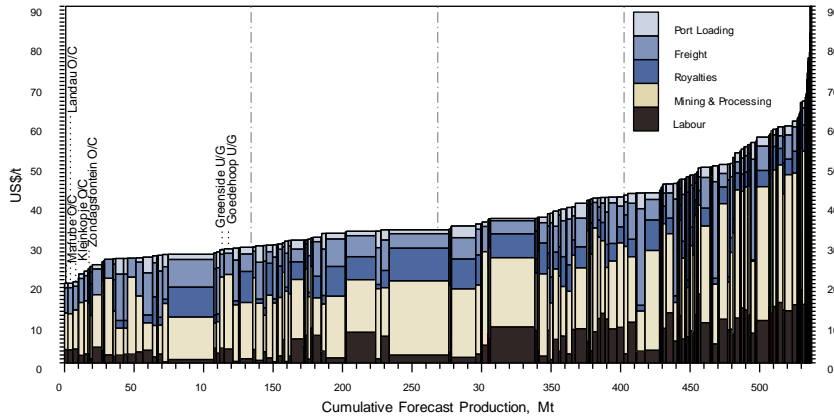
Notes: 1. "Recoverable" reserves mentioned in the de Jager Report do not comply with the SAMREC code definition of reserves, but are considered equivalent to the current mineable reserves

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## GLOBAL COST CURVE

### AME 2010 global cost curve: South African exporters are currently well positioned



Source: AME FOB cost curve 2010

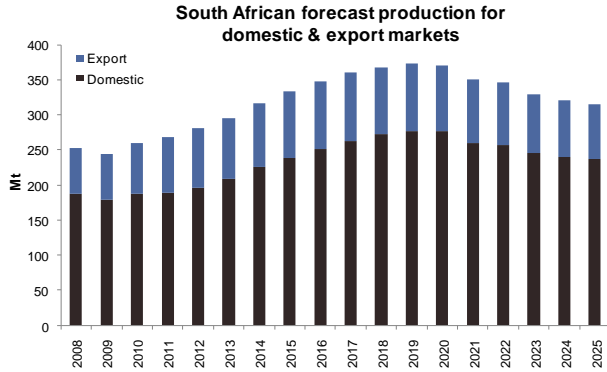
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## COAL DEMAND IN SOUTH AFRICA

South African coal production has been forecast to grow significantly in the next decade, driven by domestic power & export demand

- Production beyond 2019 is expected to remain strong - despite a number of existing operations forecast to close - with the development of new projects
- Seaborne trade expected to be driven by India - coal plant under construction is ~75GW & dependent on imports
- Significant opportunity for South African exporters to capitalize on increasing Asian demand at potentially lower qualities - for several decades

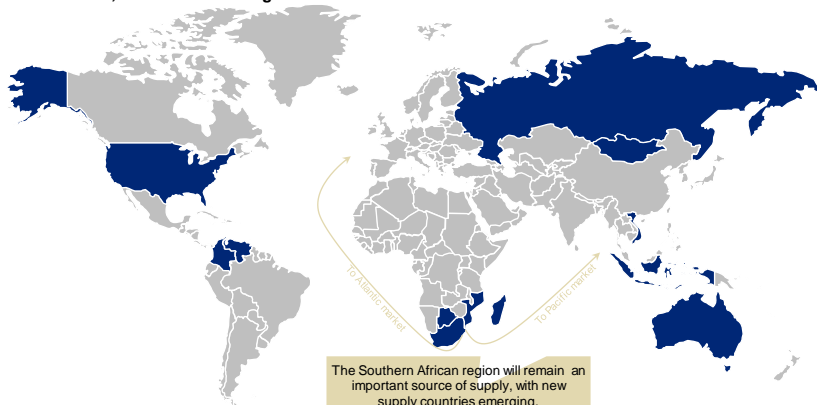


Source: Wood Mackenzie



## SOUTH AFRICA WELL POSITIONED TO SUPPLY FUTURE ATLANTIC & PACIFIC MARKETS

Supply countries will be determined by resources available, exporters' internal demand, infrastructure & regulation constraints



The Southern African region will remain an important source of supply, with new supply countries emerging. Infrastructure, local energy security and investment climate will be key drivers



## SOUTH AFRICAN COAL TRADE

What fundamentals will drive developments in global coal trade from South Africa?

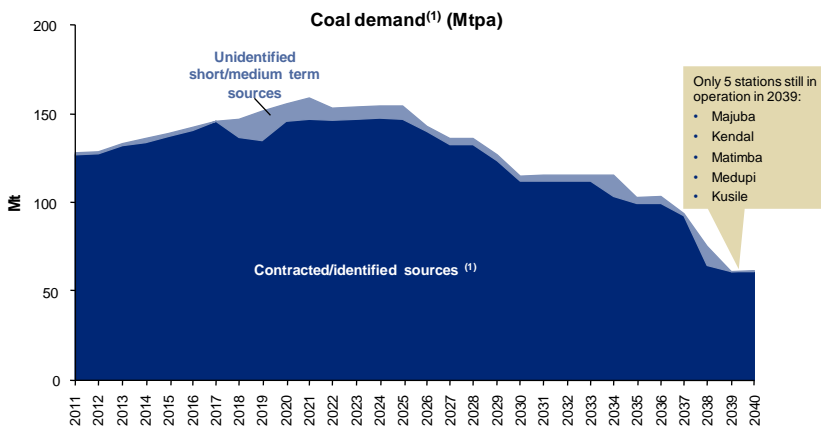
- 1 Domestic demand (including call for export regulation)
- 2 Infrastructure constraints
- 3 South Africa's carbon emission reduction commitments
- 4 Favourable investment climate, co-ordinated planning - the South African Coal Road Map

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## DOMESTIC POWER GENERATION DEMAND

Eskom's current long term sourcing planning indicates that the Mpumalanga (central basin) coal resource is just sufficient to meet its requirements



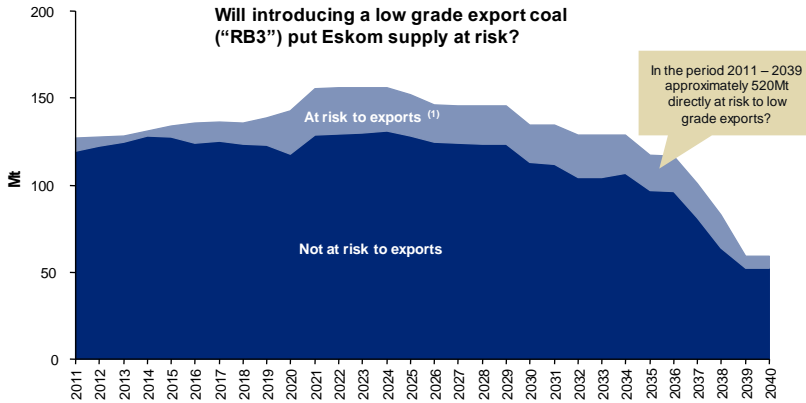
Source: Eskom PED coal portfolio model; Eskom January 2011 burn plan  
 Notes: 1. Assumes coal exports remain at current levels

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## DOMESTIC POWER GENERATION DEMAND (continued)

Coal demand further increases if lives of 3 power stations are extended to 60 years



Source: Eskom PED coal portfolio model; Eskom January 2011 burn plan  
Notes: 1. Assumes coal exports remain at current levels

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## DOMESTIC COAL SUPPLY

Is there a threat to South Africa's domestic coal supply?

- Eskom analysis is based on sourcing coal only from central basin, using its own database & existing suppliers' known projects
- Does not include the significant coal resources in central basin which are not currently reported
- Does not allow for coal from other basins, e.g. Waterberg, Soutpansberg, Tuli (Limpopo)
- Desktop analysis indicates up to 33Bt of additional coal resources exist of quality suitable for domestic power generation fleet – at 50% loss factor this would translate to 16Bt of "extractable" or ROM tonnage at >20MJ/kg
- Infrastructure development would enable not only domestic supply - but also unlock access to increased export tonnages for the next two decades or more**

### Additional domestic resources by coalfield – 2011

Coalfield	Resource (Mt)
Waterberg	15,476
Witbank	10,197
Highveld	3,145
Free State	-
Ermelo	283
V-Sasolburg	1,614
Springbok Flats	-
South Rand	1,034
Utrecht	-
Klip River	100
Vryheid	-
Kangwane	-
Nongoma	-
Soutpansberg	1,103
Tuli	944
<b>GRAND TOTAL</b>	<b>33,896</b>

Source: Prevost, 2011 – Mineable tonnes in-situ, estimated

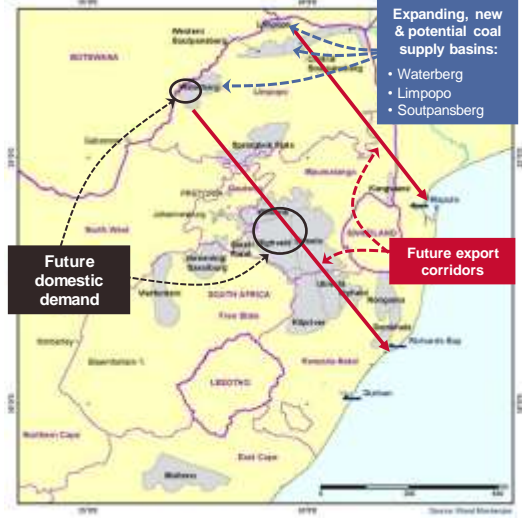
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## WHERE ARE SOUTH AFRICA'S FUTURE COAL SOURCES?

The Central basin will remain the anchor for future supply...

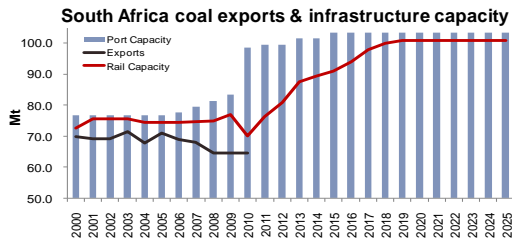
- But new supply basins will provide increasing tonnages to supply both domestic & export demand
- This will require a co-ordinated development & planning approach – including cross-border flows & regional infrastructure development



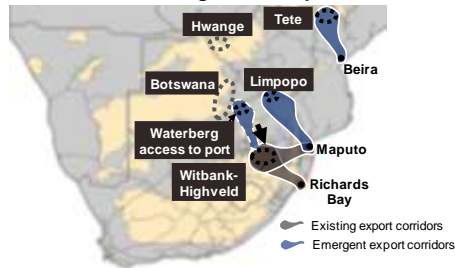
## INFRASTRUCTURE CAPACITY

There is a disconnect between export production, rail & port capacities – in South Africa & regionally

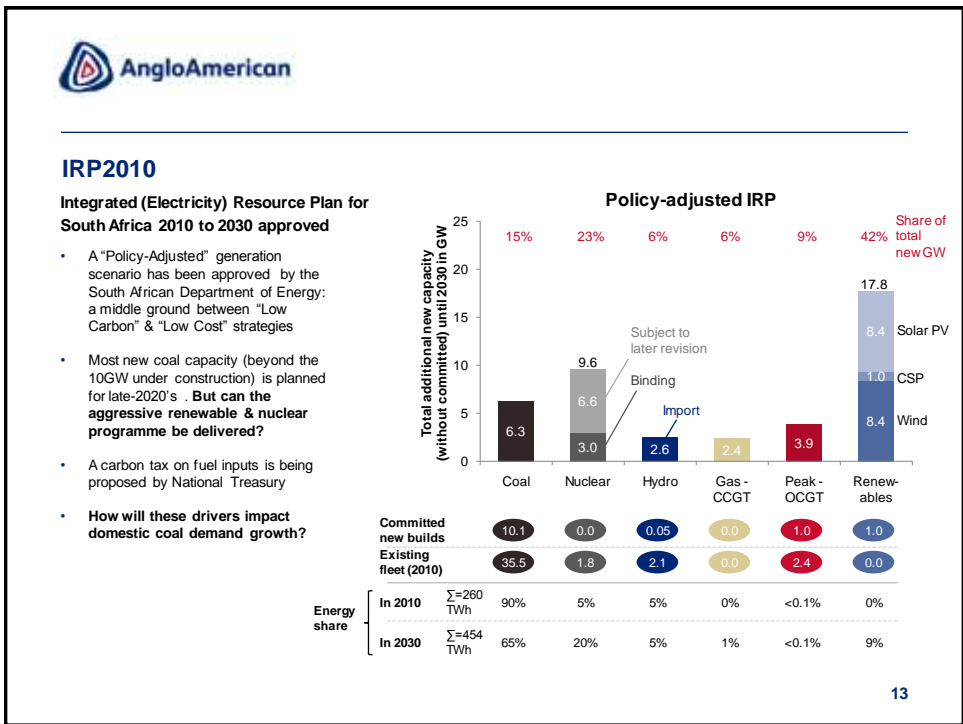
- Railing capacity on existing RBCT line must be increased
- Development of new corridors in South Africa is also required - which will enable both domestic & export sales
- Regional resources outside South Africa are believed to be +50Bt: sufficient to host numerous future power stations – as well as enabling exports
- Undeveloped basins will require significant transport infrastructure investment to enable access to exports – & also hold significant regional power generation potential



Southern African emergent coal export corridors



Source: Wood Mackenzie, Anglo American Thermal Coal



**SOUTH AFRICAN COAL ROAD MAP**

The "South African Coal Road Map" process aims to provide a basis for co-ordinated planning

- To serve as a fact-based overview of the South African Coal Industry – with "base-case" & alternative scenarios over a 25-year horizon
- To facilitate investment, planning & strategy development for a wide range of stakeholders
- To assist in maximising sustainable economic opportunities for the coal industry
- To identify appropriate policy, planning & support mechanisms to deliver optimal value for all stakeholders
- To align all stakeholders & their objectives to collectively support societal & economic objectives – accelerated growth, employment, environmental responsibility, capital & social investment

**Process fraught with delays – but initial report still due for completion within 2011**

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## IN SUMMARY

- Alignment must be reached between domestic & international demands to enable optimal extraction & to maximise benefits for all stakeholders – including poverty alleviation, full access to electricity & economic development in the region
- South & Southern Africa can remain an important supplier to the global hard coal trade for several decades
- Infrastructure will be key to unlocking potential
- South Africa's Integrated Resource Plan depends on aggressive development of nuclear & renewable energy – coal will remain the backstop energy source
- The South African Coal Road Map may assist in aligning economic, infrastructural, environmental & social strategies & development requirements

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# THANK YOU

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# APPENDIX

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## RESOURCES & RESERVES OF SOUTH AFRICA

**South African reserves<sup>(1)</sup>  
by coalfield – 1982<sup>(2)</sup>**

Coalfield	Recoverable (Mt)	%
Waterberg	20,627	34.8
Witbank	12,461	21.0
Highveld	10,979	18.5
Free State	4,920	8.3
Ermelo	4,538	7.7
V-Sasolburg	2,233	3.8
Springbok Flats	1,700	2.9
South Rand	730	1.2
Utrecht	511	0.9
Klip River	472	0.8
Vryheid	71	0.1
<b>GRAND TOTAL</b>	<b>59,241</b>	<b>100</b>

**South African reserves<sup>(1)</sup>  
by coalfield – 2009<sup>(3)</sup>**

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## CARBON STORAGE POTENTIAL

Estimated capacity of geological storage in South Africa is around 150 Gt (150,000Mt) of CO<sub>2</sub> - but less than 2% of that capacity occurs onshore

- The largest storage volume (~98% of total storage potential) is present in the Mesozoic basins along the coast of South Africa
- Storage potential lies mainly in the saline formations associated with the oil- & gas-bearing sequences in the Outeniqua, Orange & Durban/Zululand Basins
- Less than 2 % of the estimated storage capacity of South Africa occurs onshore, including ~0.46Gt for the onshore Zululand Basin
- SA Centre for CCS working towards a test injection to be followed by a demo plant

Potential geological storage sites:  
Carbon Storage Atlas

