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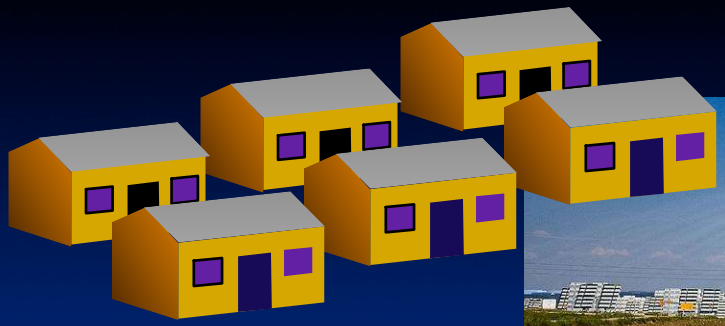

Planning for low-carbon development: Coal, renewables and co-benefits

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Presentation at Melbourne Energy Institute 'Energy futures' seminar series

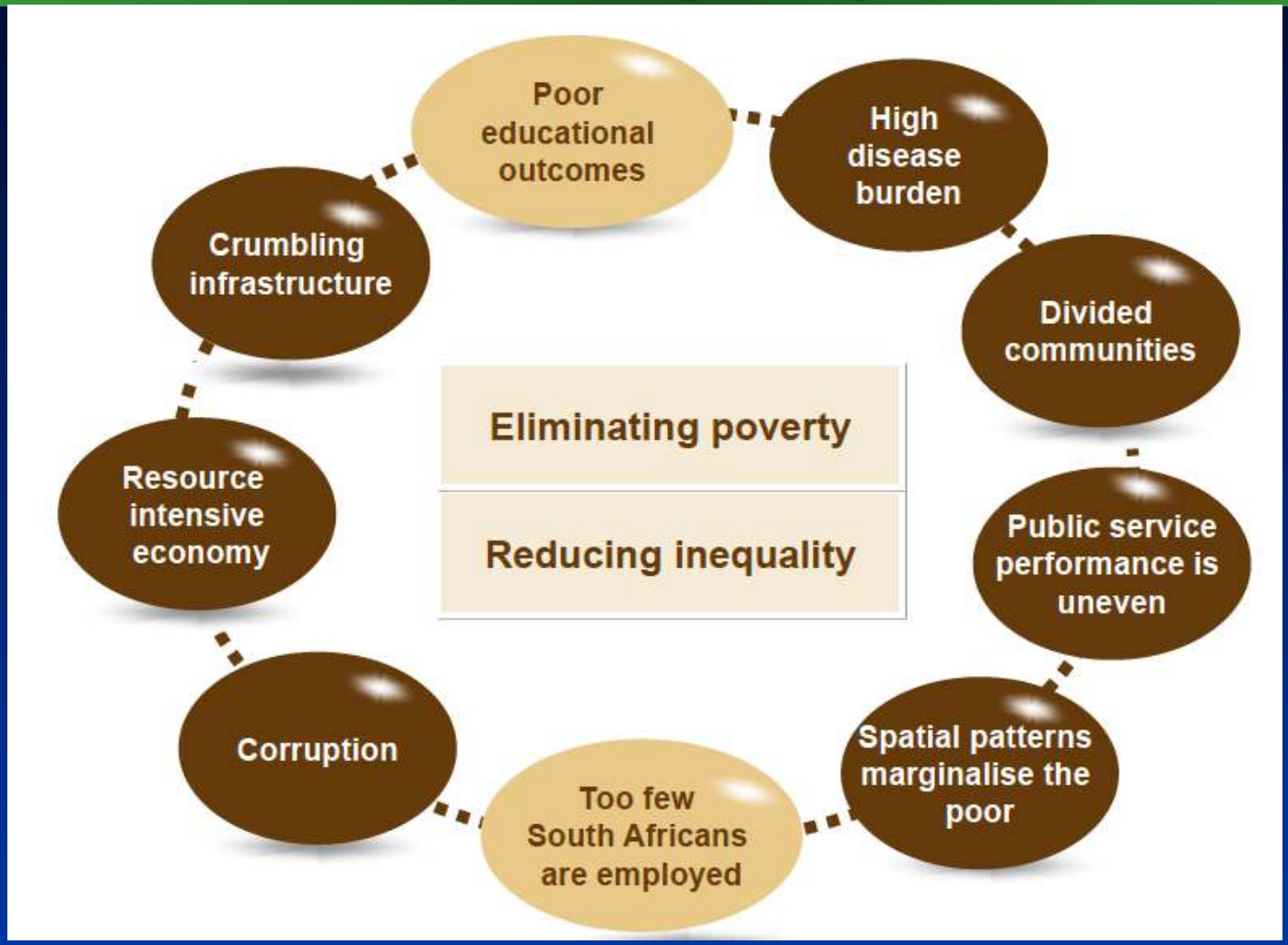
6 February 2013

Energy Research Centre University of Cape Town

Context – SA and Australia

	Australia	South Africa
Contextual and developmental indicators		
Population size	22.8 million	51.7 million (2011 census)
Size of economy, GDP_{ppp}	$915.098 billion	$578.640 billion (IMF 2012 est)
Income, GDP_{ppp} / capita	$40,847	$11,302
Gini coefficient (100 unequal, 0 equal); Human Dev. Index	30.5; 0.929	63.1; 0.619
GHG emissions indicators		
Absolute annual GHG emissions	543 Mt CO_2-eq 581 incl LULUCF (in 2010, six gases, reported in FCCC/ SBI/2012/31)	461 Mt CO_2-eq 442 incl LULUCF (in 2000, three gases, reported in 2nd NatComm, 2009)
Emission projections by 2020	693 Mt CO2-e in 2020 DCCEE 2012	749 Mt CO2-e in 2020; 615 lower, 883 upper bound BAU LTMS 2007; Note to White Paper 2011
Per capita emissions (GHG / capita)	25; 27 (DCCEE 2012; CAIT)	9 (CAIT)
Emissions intensity (CO2 / TPES and CO2 / GDPppp)	3.01 t CO2 / TPES 0.56 t CO2 / 2000 US$ (IEA 2011)	2.56 t CO2 / TPES 0.70 t CO2 / 2000 US$ (IEA 2011)
Carbon intensity of electricity (CO_2 / kWh)	814 gCO2 / kWh (CAIT)	963 gCO2 / kWh (Eskom AR)
Energy and power indicators		
Total primary energy supply (TPES)	131 Mtoe (IEA, for 2009)	161 Mtoe (IEA, for 2009)
Coal as share of TPES	37%	73%
Electricity generated (TWh)	244 TWh (IEA, for 2009)	224 TWh (IEA, for 2009)
Access to electricity (% pop)	99%?	80% (for lighting)

Eliminating poverty and reducing inequality are key strategic objectives



- Source: National Planning Commission 2011 Diagnostic Report


South
African
coal and
some
global
context

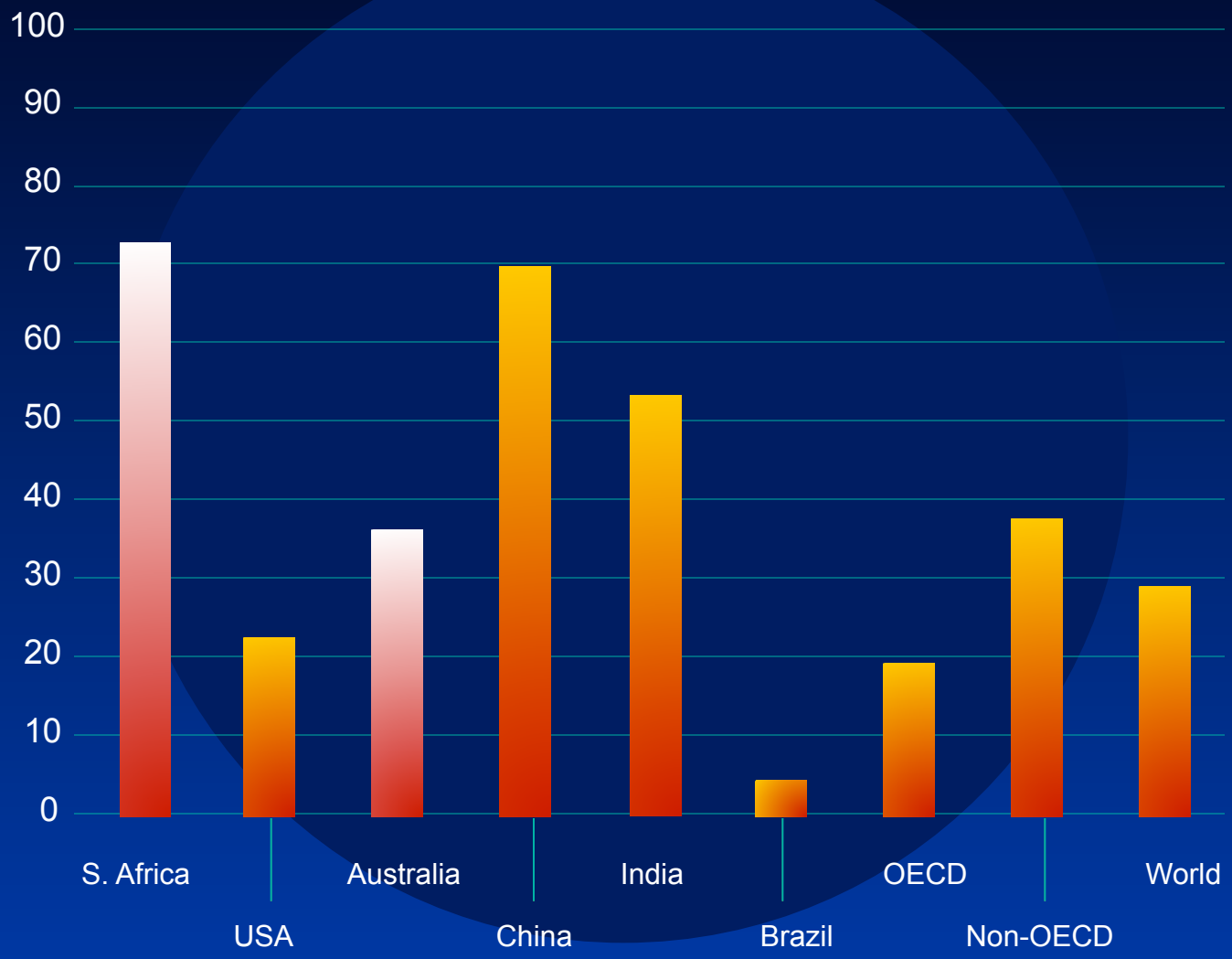
Coal use in South Africa

73% of primary energy

30% of liquid fuels

93% of electricity production
(Eskom = 125Mt in 2011)

Coal as share of total primary energy consumption



Source: BP Statistical Review of Energy 2011

ERC

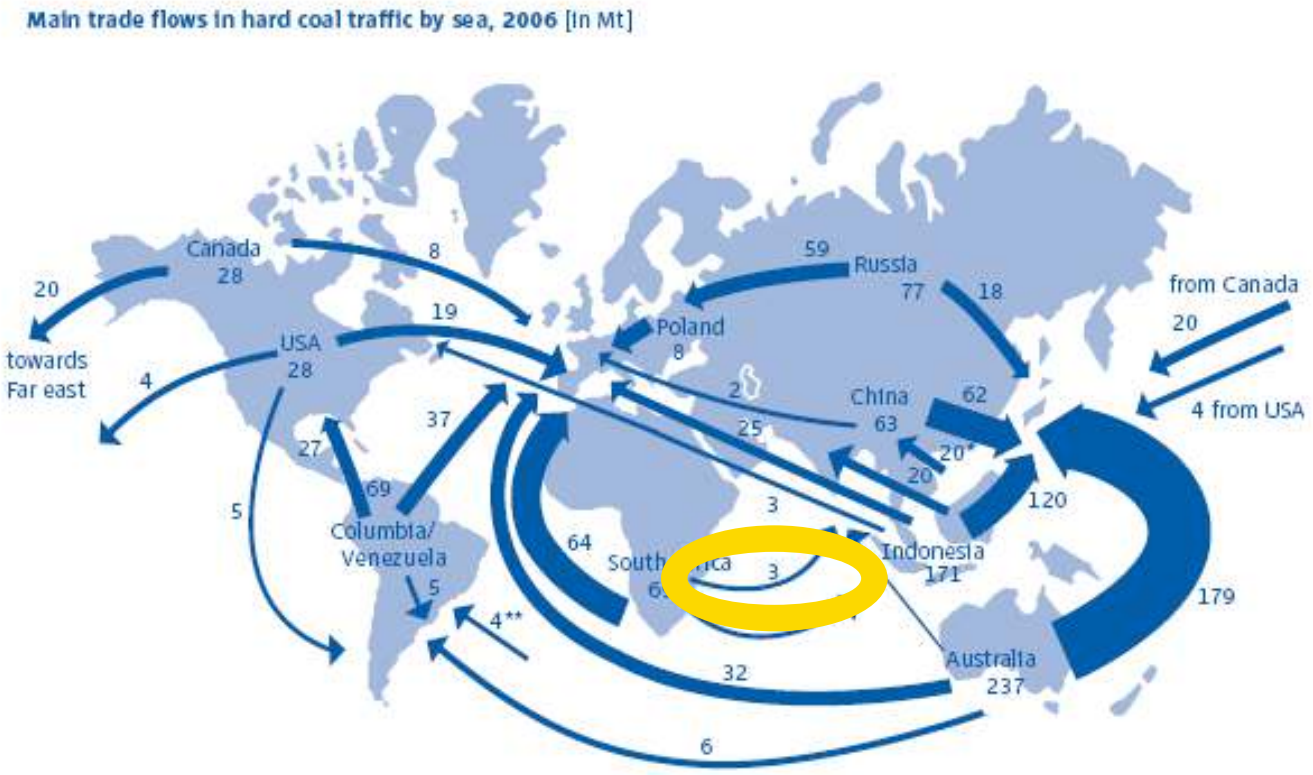
South African and Australian coal in a global context

Hard coal production (2010 Mt)	
China	3 162
USA	932
India	537
Australia	353
South Africa	255
Russia	248
Indonesia	173

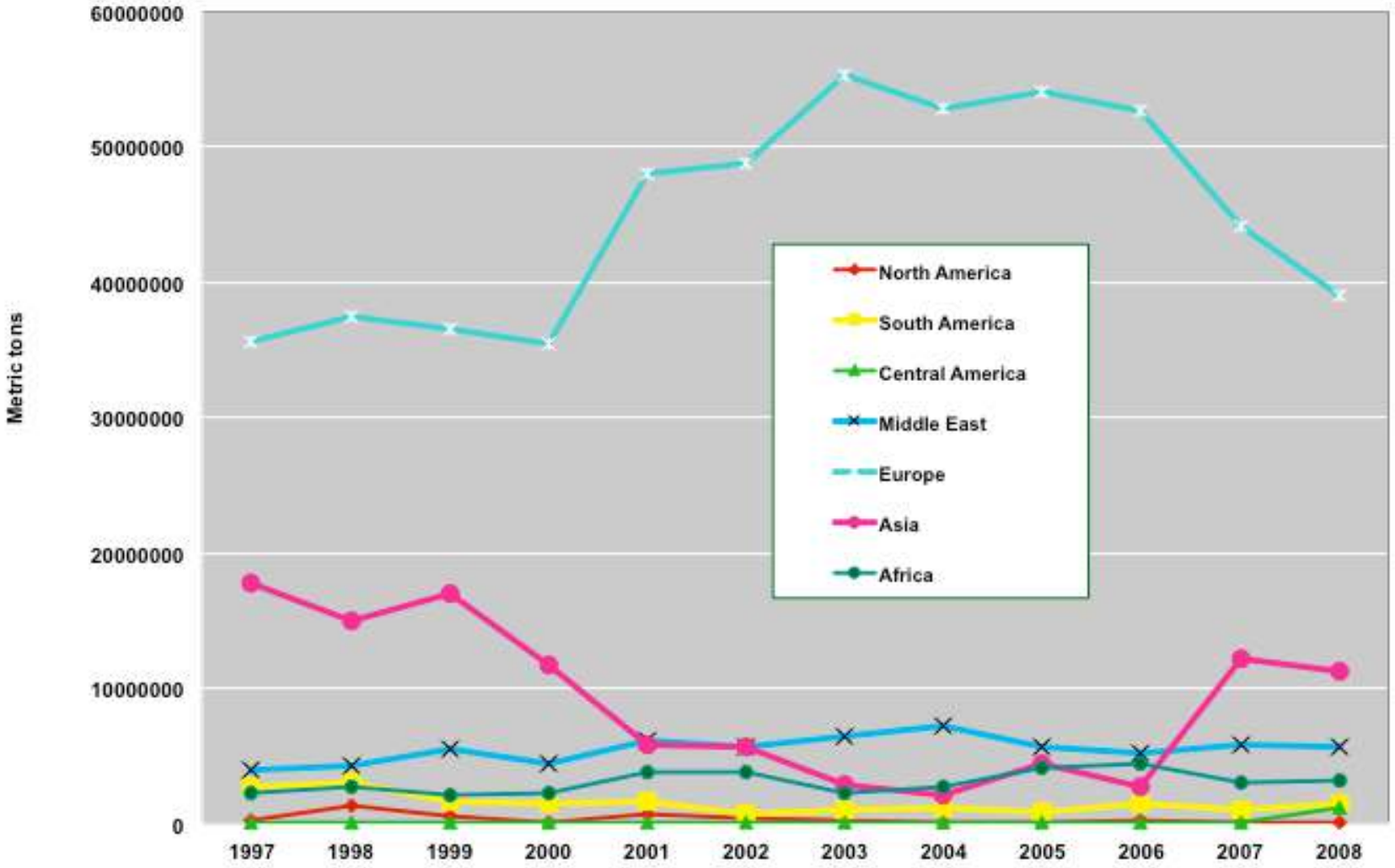
Hard coal exports (2010 Mt)	
Australia	298
Indonesia	162
Russia	109
USA	74
South Africa	69
Colombia	69

Source: IEA Coal Statistics 2011

Coal trade flows (2007)



Trends in coal export from Richards Bay
(up to 2009)



Renewable energy technologies – scenarios, IPP procurement programme, costs and co-benefits

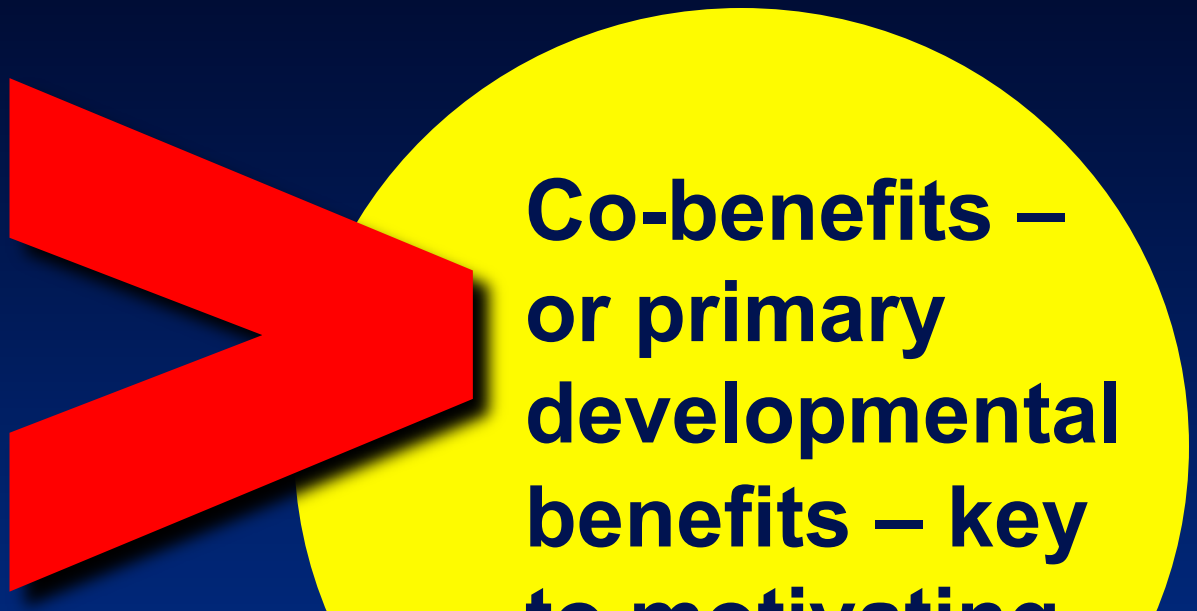
Studies of RE often focus on mitigation and costs

Marquard, Merven and Tyler (2008), *Costing a 2020 Target of 15% Renewable Electricity for South Africa*

- 15% RE for electricity by 2020 – electricity costs slightly (15%) higher than baseline – context of doubling of prices
- Combined with EE programme, average electricity costs will *lower* than baseline for most of 2015-2020
- Add carbon finance to both RE and EE – 18% below modelers' reference case
- Mitigation costs turn from added costs (R141 / t CO2-eq; or 0.10% of GDP) to negative (-R39, i.e. saving; -0.07% of GDP)
- Consider other cost parameters – total system cost,annual investment requirements, total annual electricity production costs (from annualised capex), average cost of electricity
- But what about benefits?

Key developmental benefits of RE

- In context of poverty and inequality
- Key motivator of policy is development, rather than climate
- Benefits of renewable energy significant in terms of
  - Job creation
  - Water – reduced use of scarce resource, further stresses from climate change
  - Local community participation
  - Local content, if well designed
  - Ownership, control, management
  - Socio-economic development
- (Latter may also be applied to baseload IPP – announced late 2012)

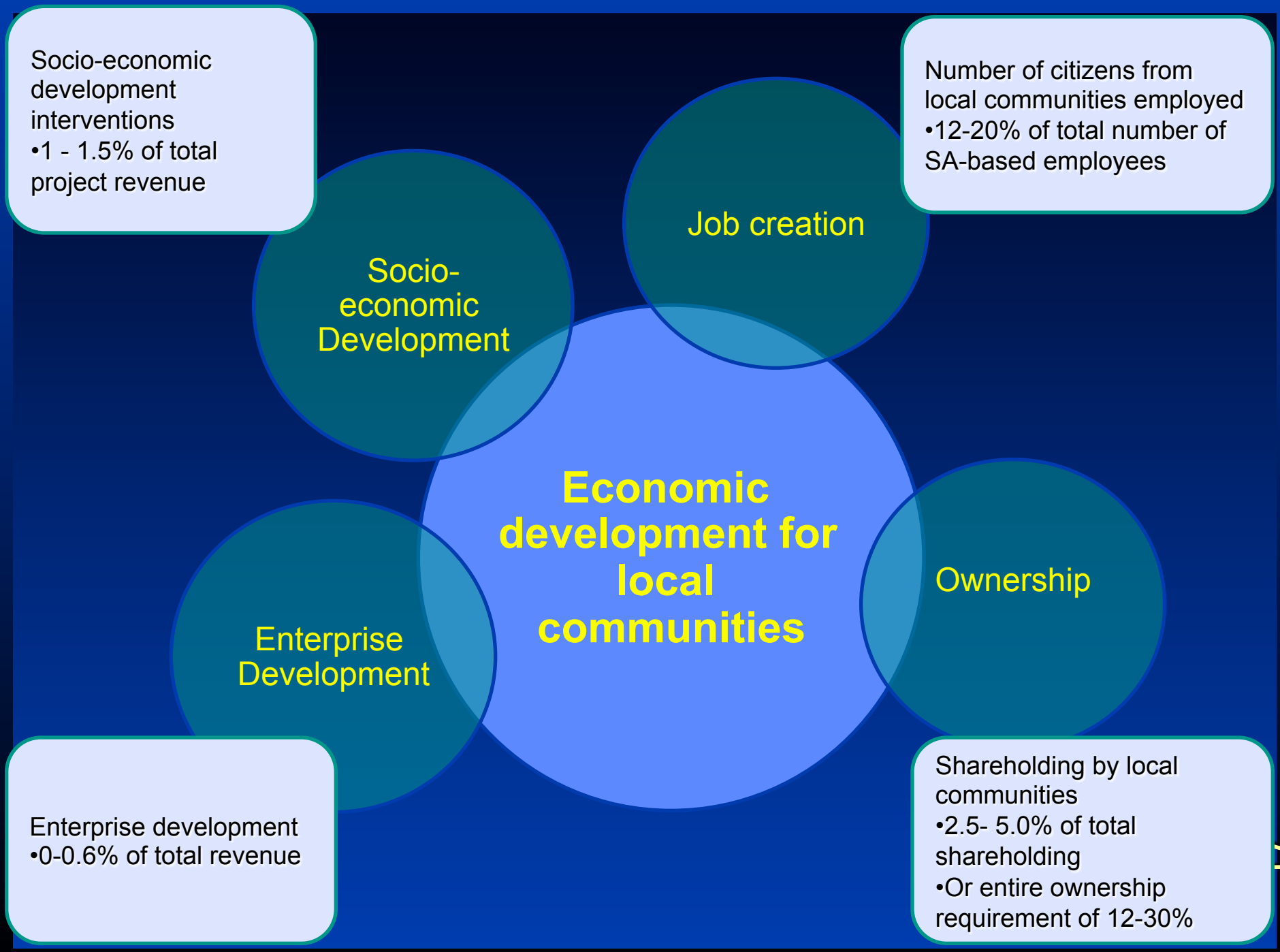

Co-benefits –
or primary
developmental
benefits – key
to motivating
action in SA

Renewable energy independent power producer procurement programme (IPPPP)

- Procuring 3725MW in five different rounds
- 1st round: 53 bids received, 28 preferred bidders
- 2nd round 79 bids received, 19 preferred bidders
- 3rd round submissions due 1 October 2012

47 selected projects in July 2012
Financial closure in September 2012 on 28 projects, 1425 MW, R47 billion investment

Data Source: Department of Energy


Socio-economic development interventions
•1 - 1.5% of total project revenue
Number of citizens from local communities employed
•12-20% of total number of SA-based employees
Socio-economic Development
Job creation
Economic development for local communities
Enterprise Development
Ownership
Enterprise development
•0-0.6% of total revenue
Shareholding by local communities
•2.5- 5.0% of total shareholding
•Or entire ownership requirement of 12-30%

EDC ELEMENT OBLIGATIONS				Onshore Wind		
No.	Group	Description	Measurement	Threshold	Target	Bidder's Response
1.	Job creation	100-SR-01 RSA-Based Employees who are Citizens	Number of Citizens employed *100 / Number of RSA Based Employees	50.0%	80.0%	
		100-SR-02 RSA-Based Employees who are Black Citizens	Number of Black Citizens employed *100 / Number of RSA Based Employees	30.0%	50.0%	
		100-SR-03 Skilled Employees who are Skilled Black Citizens	Number of Skilled Black Citizens employed *100 / Skilled Employees	18.0%	30.0%	
		100-SR-04 RSA-Based Employees that are Citizens from Local Communities	Number of Citizens from Local Communities employed *100 / Number of RSA Based Employees	12.0%	20.0%	
2.	Local Content	200-SR-01 Value of Local Content Spend	Value of Local Content Spend / Total Project Value	15.0%	25.0%	
3.	Ownership	300-PC-01 Shareholding by Black People in the Project Company	Shareholding by Black people / Total Shareholding	12.0%	30.0%	
		300-CC-01 Shareholding by Black People in the Contractor responsible for Construction		8.0%	20.0%	
		300-OM-01 Shareholding by Black People in the Operations Contractor [5]		8.0%	30.0%	
		300-PC-02 Shareholding by Local Communities in the Project Company	Shareholding by Local Communities / Total Shareholding	2.5%	5.0%	
4.	Management control	400-SR-01 Black Top Management	Number of Black People in Top Management using the Adjusted Recognition of Gender *100 / Number of People in Top Management		40.0%	
5.	Preferential Procurement	500-SR-01 BBBEE Procurement Spend	Amount of Procurement Spend on BBBEE Contributors recognised in terms of BBBEE Recognition Levels * 100 / Total amount of Procurement Spend		60.0%	
		500-SR-02 QSEs and EMEs Procurement	Amount of Procurement Spend on QSEs and EMEs * 100 / Total amount of Procurement Spend		10.0%	
		500-SR-03 Women Owned Vendors Procurement	Amount of Procurement Spend on Women Owned Vendors * 100 / Total amount of Procurement Spend		5.0%	
6.	Enterprise Development	600-SR-01 Enterprise Development Contributions	Enterprise Development Contributions * 100 / Revenue		0.6%	
		600-SR-02 Adjusted Enterprise Development Contributions	Adjusted Enterprise Development Contributions * 100 / Revenue		0.6%	
7.	Socio-Economic Development	700-SR-01 Socio-Economic Development Contributions	Socio-Economic Development Contributions * 100 / Revenue	1.0%	1.5%	
		700-SR-02 Adjusted Socio-Economic Development Contributions	Adjusted Socio-Economic Development Contributions * 100 / Revenue	1.0%	1.5%	

Co-benefits of coal ?

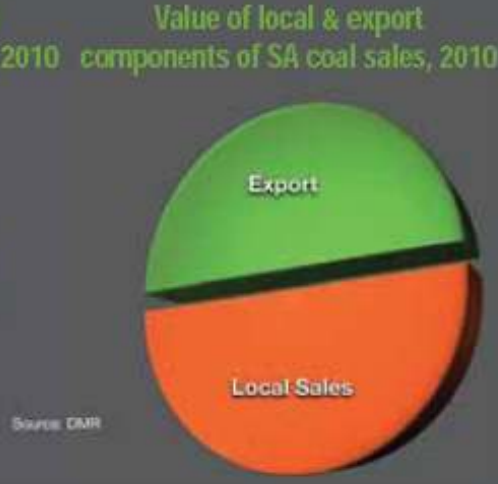
Key mining sector

- Production 2010: 254.5Mt
- Exports 2010: 66.3Mt
- Value: R73.2bn
- 73 817 jobs
- 1.2% GDP direct
- 3% indirect

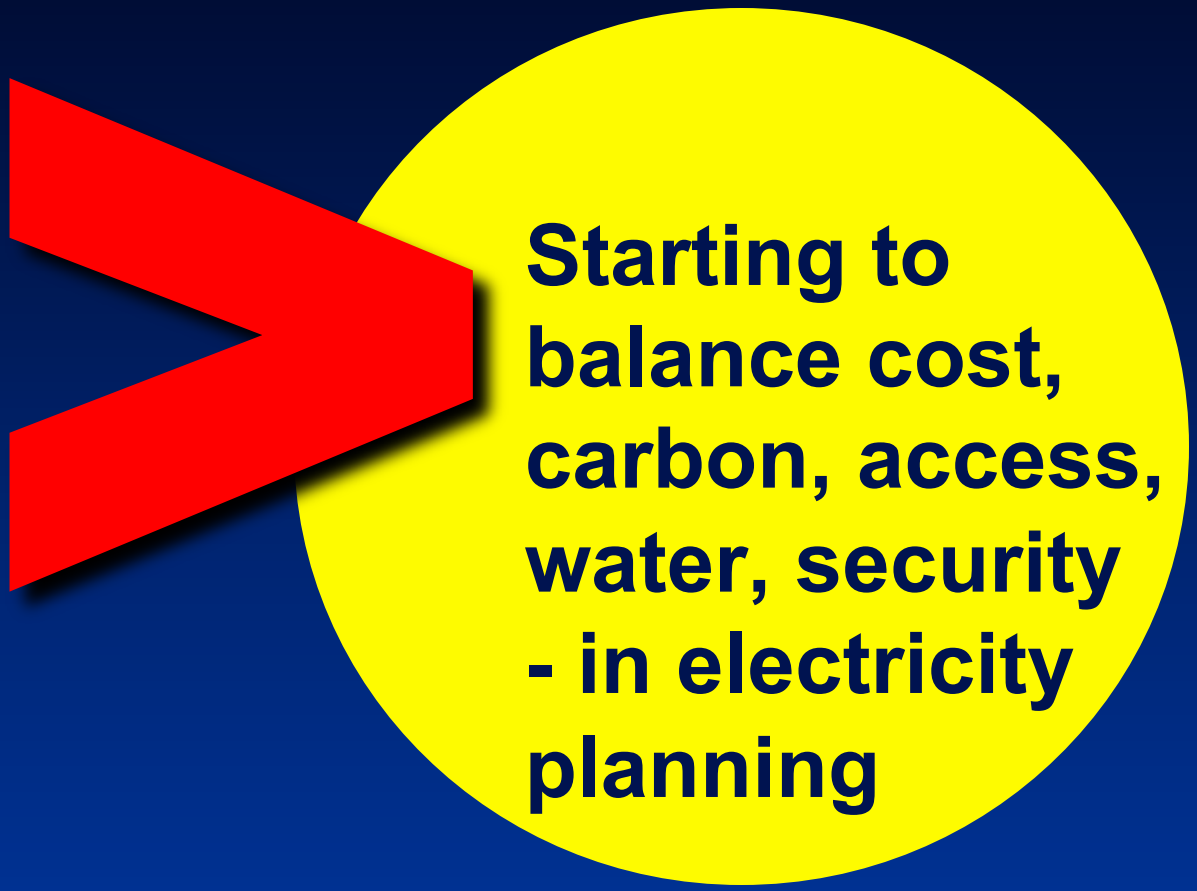
Saleable production

	Metric tons
2001	223 494.7
2002	220 269.6
2003	237 872.1
2004	243 371.5
2005	244 988.2
2006	244 832.4
2007	247 666.4
2008	252 699.1
2009	250 538.1
2010	254 521.9

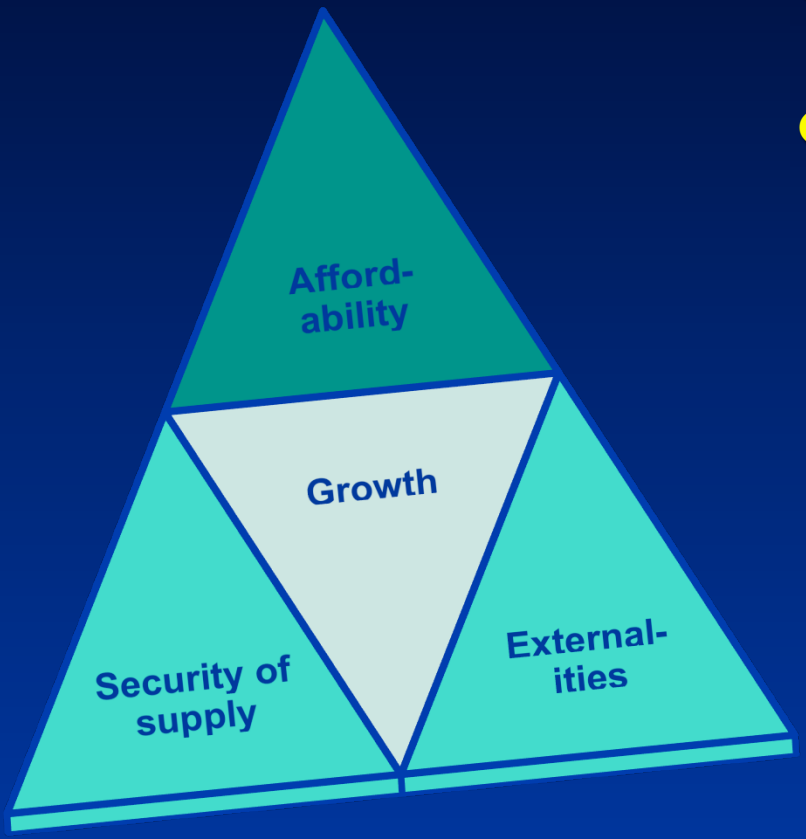
Source: DMR



Source: Chamber of Mines Facts and Figures 2010


Starting to balance cost, carbon, access, water, security - in electricity planning

Multipled criteria used in IRP2010 – with carbon the key externality

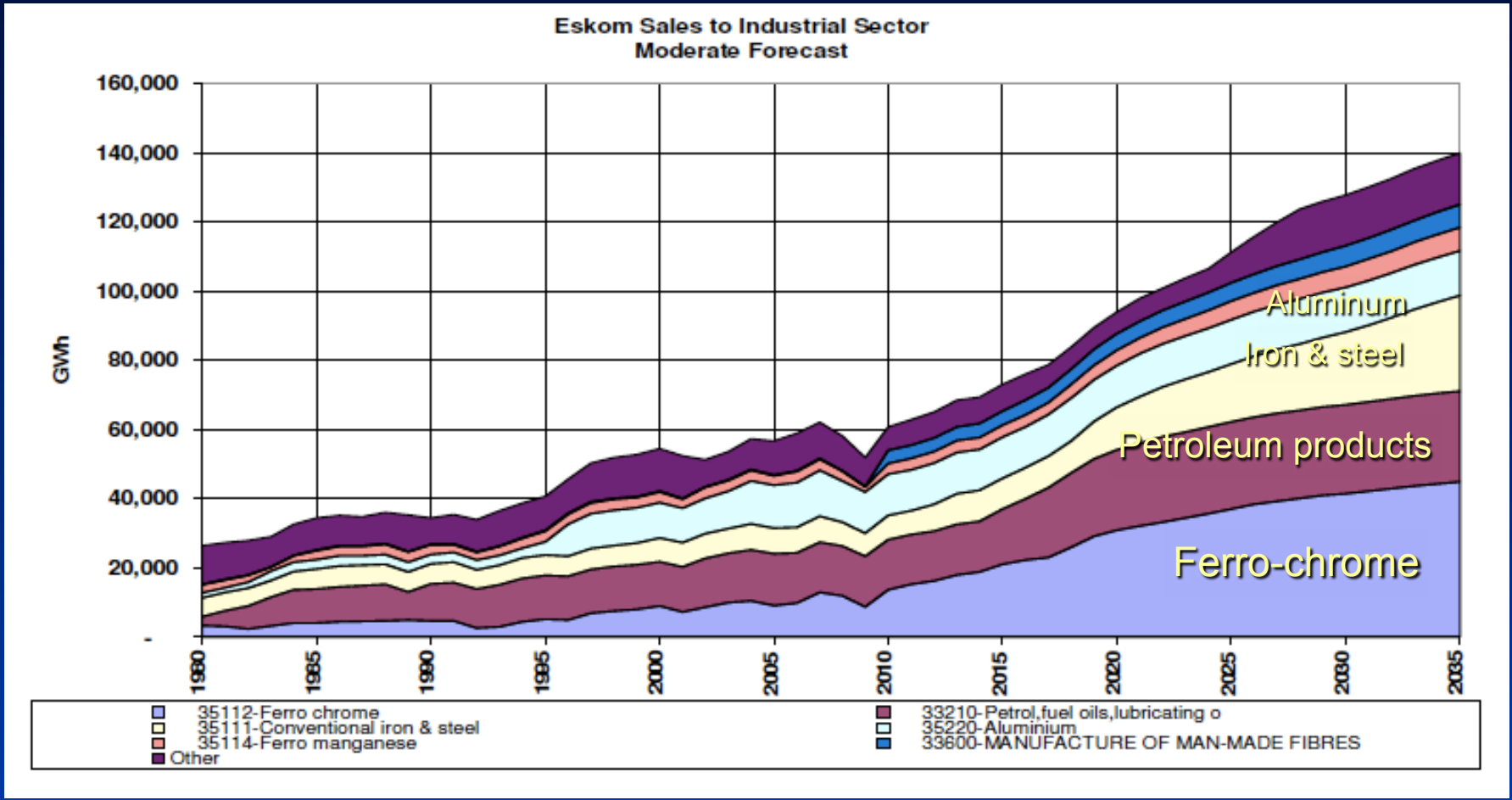


Source: Department of Energy, presentation on IRP 2010-2030

WISE COMPROMISES REQUIRED

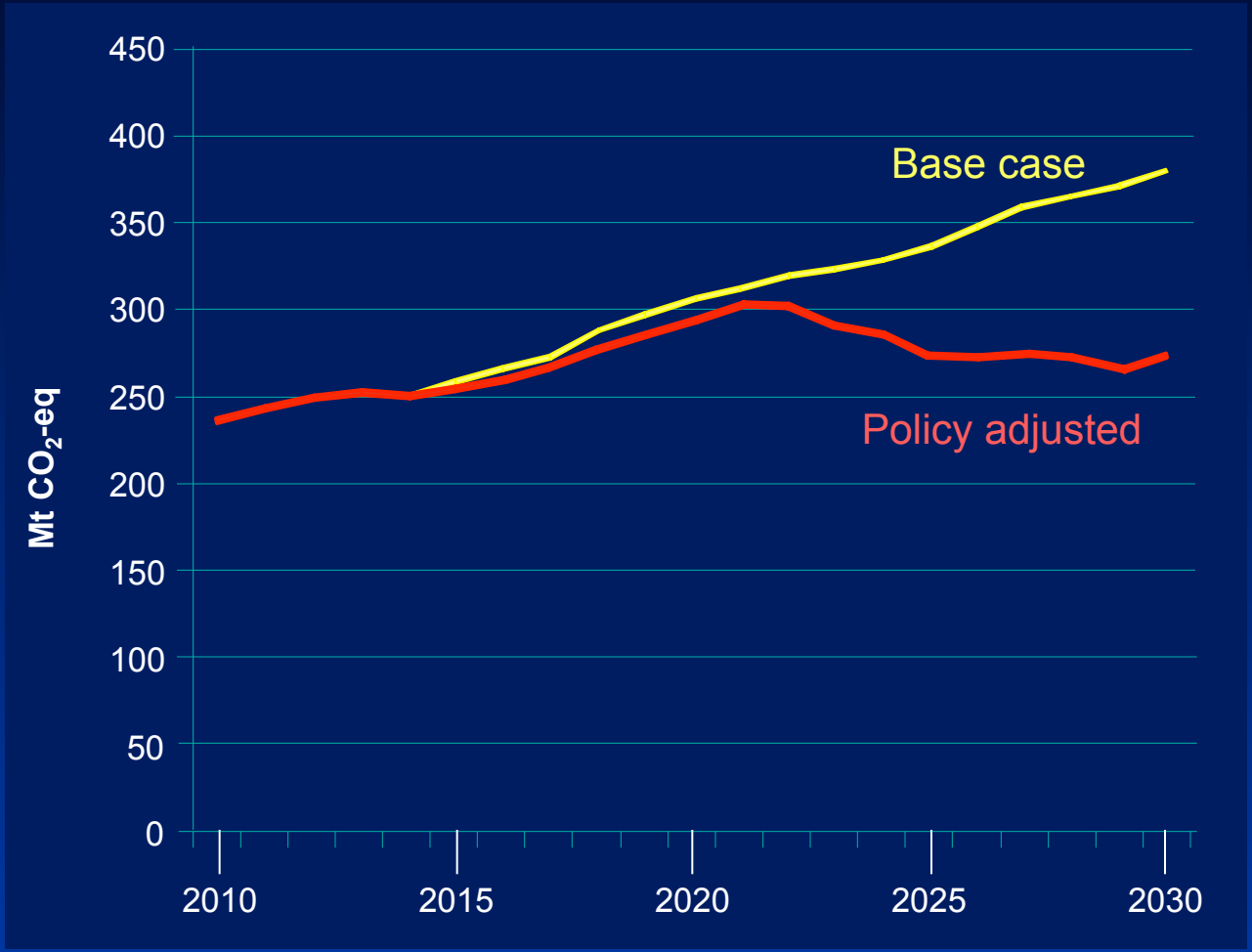
- The IRP must balance economic, social and environmental objectives
- It should provide affordable energy,while
  - ensuring security of supply,
  - providing opportunities for creation of local industry clusters,
  - and helping to achieve the emission targets committed to in Copenhagen

IRP2010 demand forecast assumes continuation of minerals-energy complex



Source: IRP2010 energy forecast rev 2 report

Emissions in electricity plan



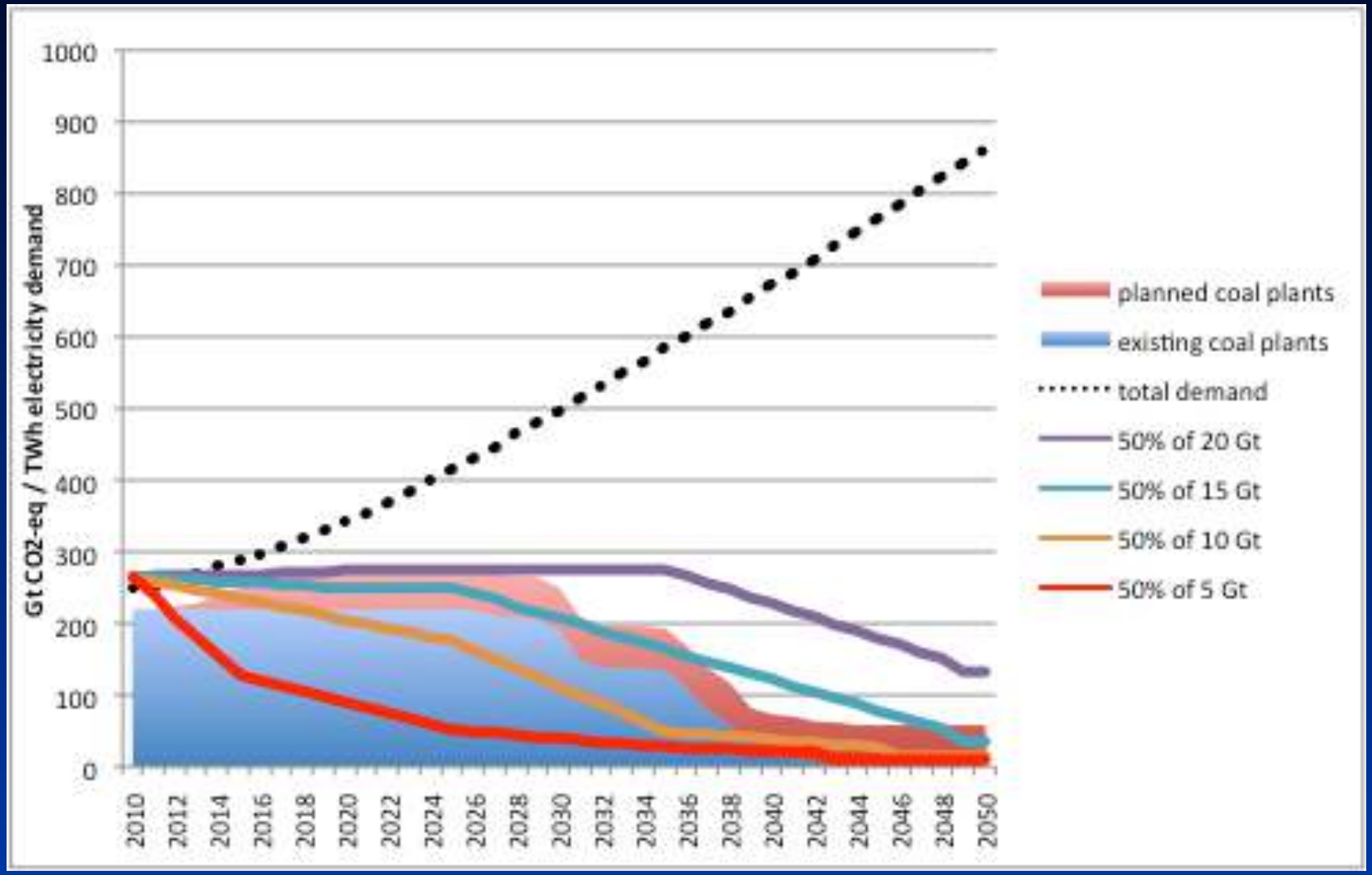
Source: Based on data in IRP 2010

Electricity price increase due to build pgm, not carbon

except in EM 3.0 poorly formulated

Figure 9. Price curve for scenarios

Electricity transition with a carbon budget



Concluding remarks

- Significant effort required, under BAU SA's per capita emissions would grow as high as Australia's
- Electricity key sector – coal and renewable energy sources large
- Both SA and Australia use and export significant coal, signficant renewable energy sources
- Shifting away from coal is a major challenge in transition to a low-carbon development path
- For South Africa, have to achieve at same time as eliminating poverty and reducing inequality
- Need to start from development to address mitigation
- How do we assess costs and benefits? And more than just financial cost
- Jobs, water, local community participation, local content, ownership, management;
- SA's electricity plan started to balance economic, social and environmental criteria

Thank you

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