

ENERGY SECURITY

COAL SUPPLY AND DEMAND – FACT OR FICTION?

ENERGY EDGE

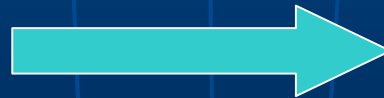
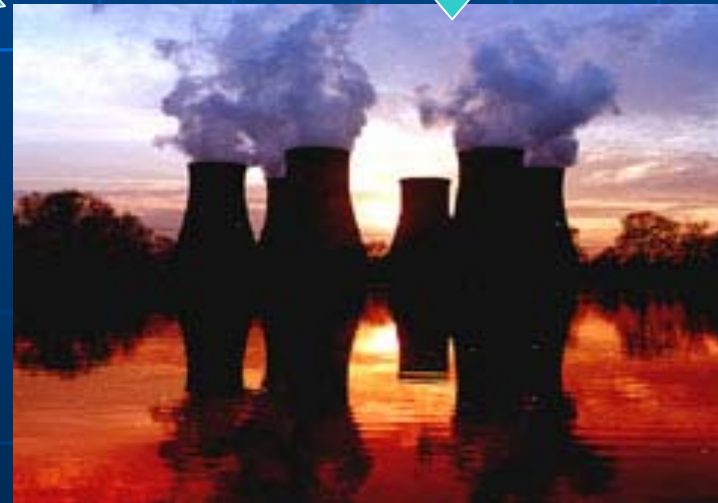
ENERGY WHO?

- Energy Edge provides a comprehensive range of services to companies throughout the energy sector
- We combine experience and expertise in all areas of the industry
- One-stop shop for all needs
- Specific and extensive experience in coal markets and developments

COAL'S TRADITIONAL VALUES

- Cheap and safe
- Widely available, diversity of supply
- (Fairly) easy to mine
- Simple and safe to treat
- Effective burning not difficult
- Safe handling and transport characteristics

OUR MOST PRECIOUS COMMODITY

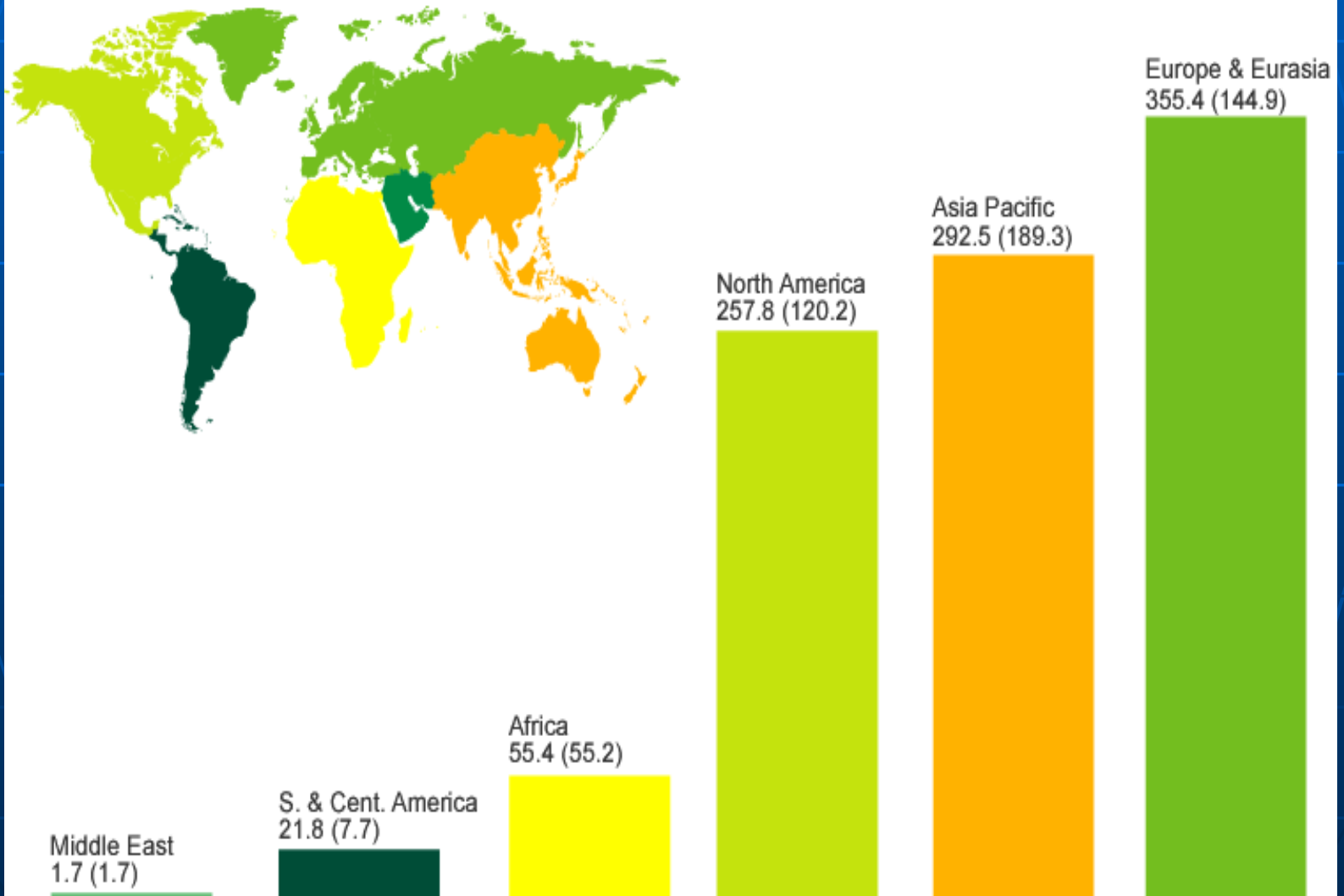


PLENTY OF COAL - RIGHT?

- Wide ranging views on future coal demand
- Generally accepted that coal's future looked bleak five years ago
- Prospects seem brighter now
- Coal demand in Europe seems more likely than not to grow slowly in tonnage terms
- Is the general assumption that there is lots of cheap coal in the world strategically sound?

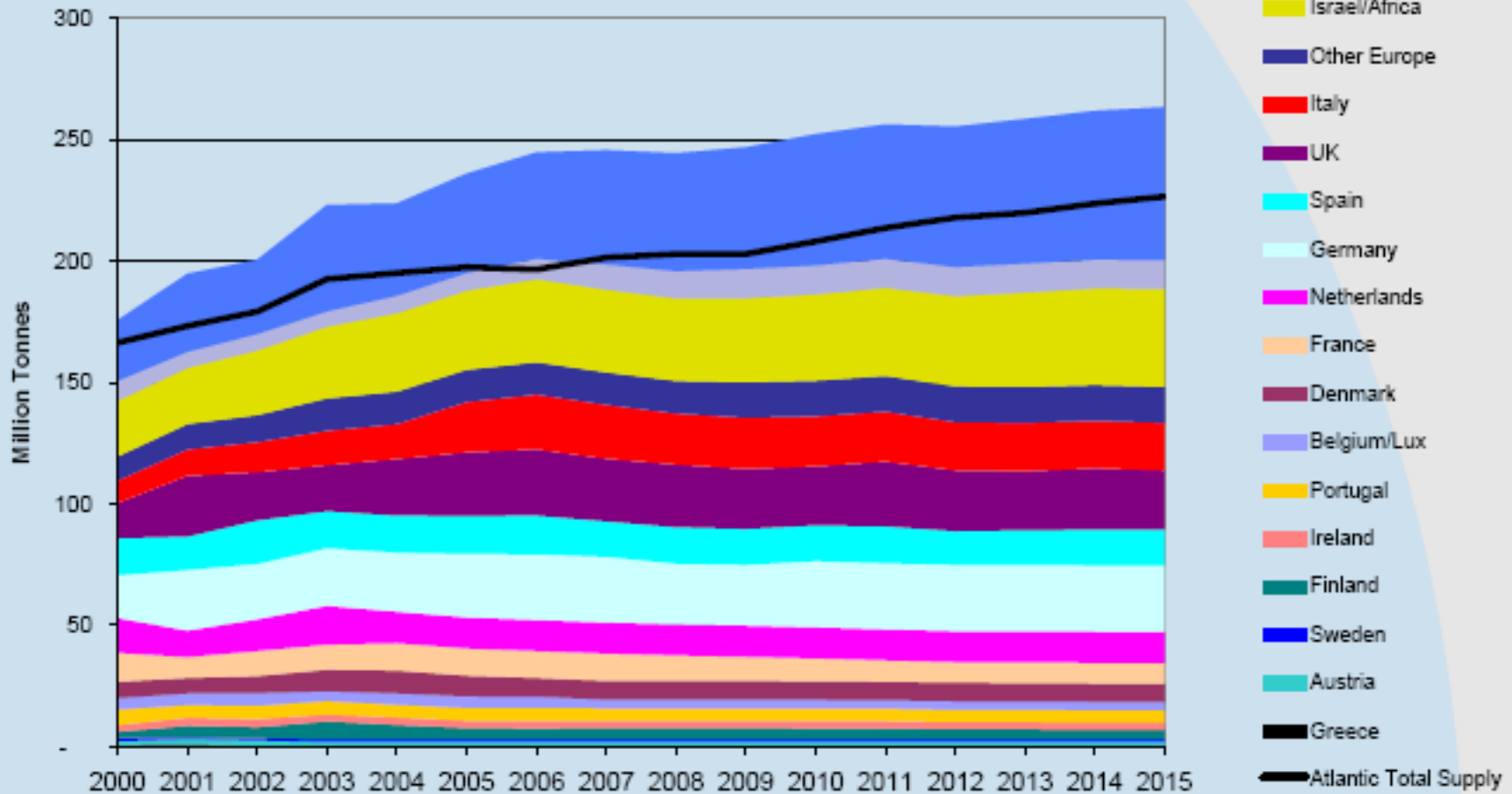
Proved coal reserves 2003

Thousand million tonnes (share of anthracite and bituminous coal is shown in brackets)



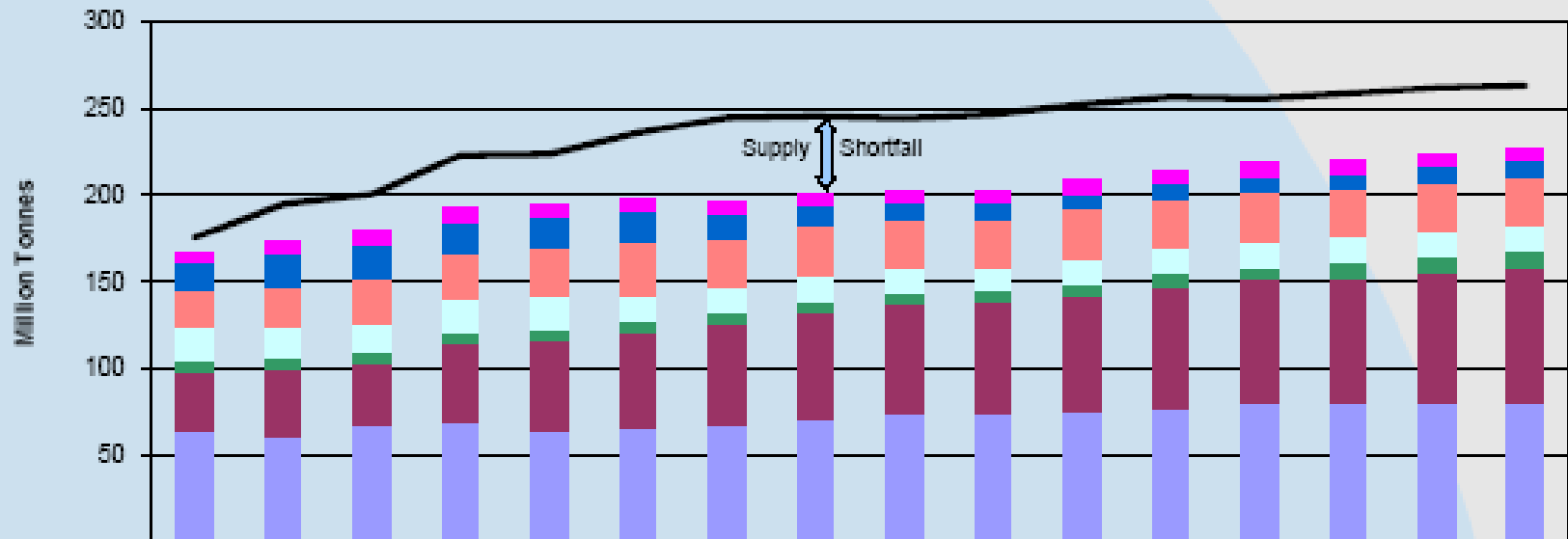
COAL DEMAND – ATLANTIC BASIN

Atlantic Imported Thermal Coal Demand Summary



COAL SUPPLY – ATLANTIC BASIN

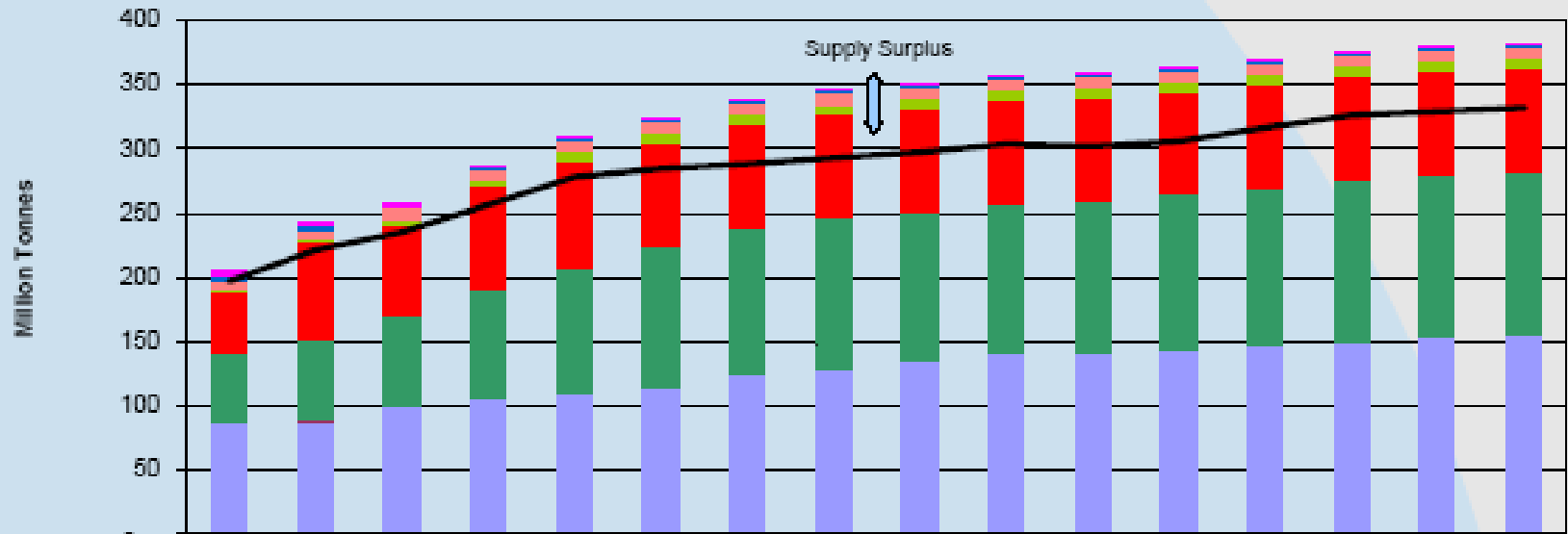
Atlantic Thermal Coal Export Supply



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Norway	0.4	1.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Other Europe	1.7	3.9	4.2	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
UK	0.6	0.5	0.5	0.8	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4
Czech Republic	2.0	1.1	1.1	1.7	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Poland	16.9	19.7	19.8	18.6	18.0	18.5	14.0	12.0	10.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Russia West	20.1	21.9	26.1	28.3	27.5	31.0	29.0	29.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Canada	1.4	0.8	0.9	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
USA	17.9	17.5	14.9	18.7	19.2	14.0	13.8	13.1	13.1	13.1	14.7	14.5	14.3	14.1	13.8	13.8
Venezuela	6.5	6.3	5.6	5.9	6.2	6.7	6.7	6.7	6.7	6.7	6.7	7.7	7.7	8.9	9.8	10.4
Colombia	34.3	38.9	36.4	45.3	51.3	55.3	56.4	62.4	63.5	64.5	66.0	69.7	71.2	72.2	75.2	77.7
Other Africa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
South Africa	66.8	61.1	67.8	69.6	65.2	68.4	67.1	70.7	74.0	74.0	76.3	76.3	80.3	80.3	80.3	80.3
Atlantic Demand	175.7	194.8	200.6	223.0	223.7	235.9	244.6	245.8	244.3	246.7	252.1	256.3	255.3	258.4	261.8	263.3

COAL SUPPLY – PACIFIC BASIN

Pacific Thermal Coal Export Supply



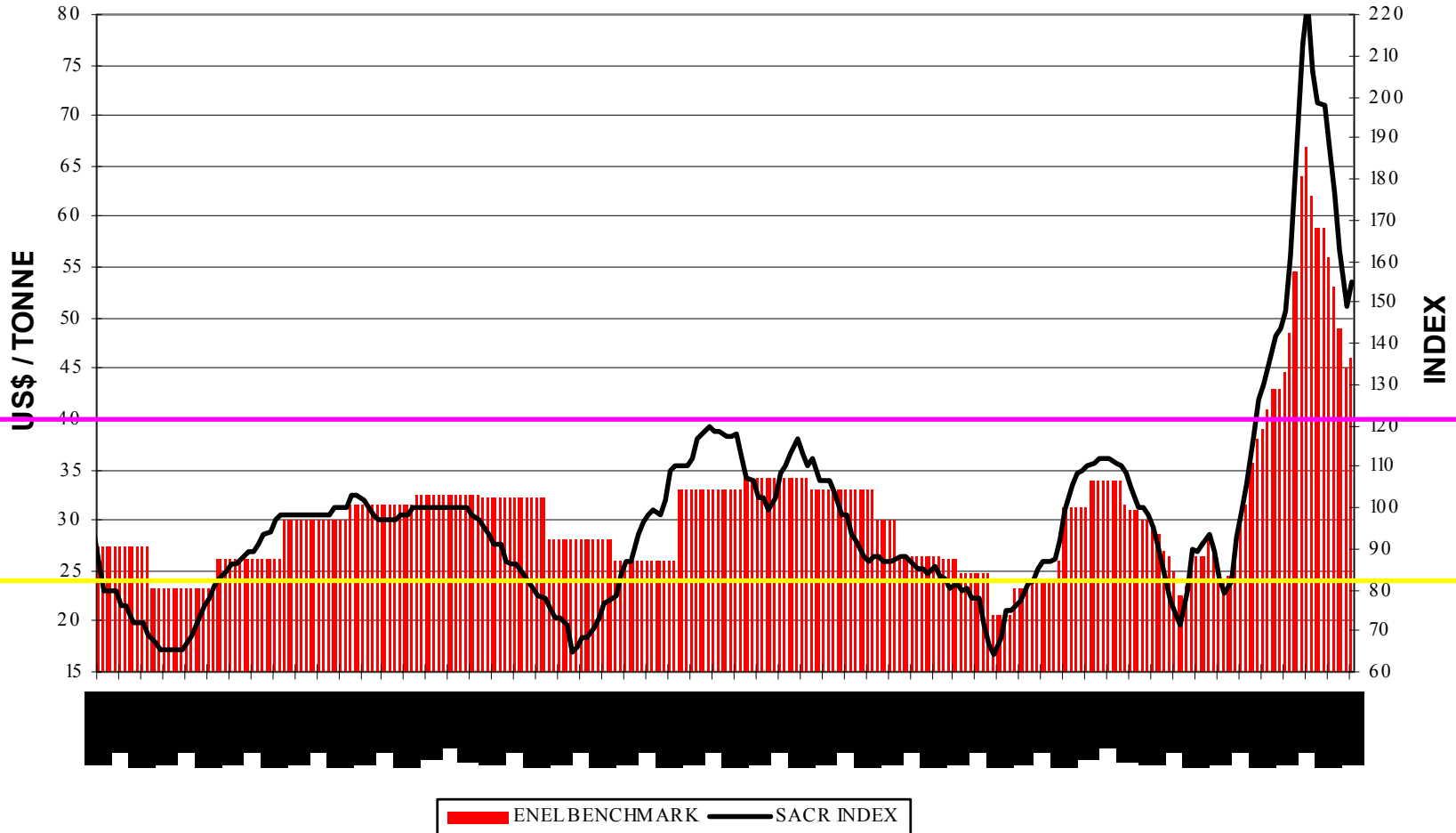
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Other	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
USA	3.9	2.3	1.4	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Canada	3.6	2.9	2.1	1.7	1.7	1.7	1.6	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Russia East	6.8	6.6	8.9	7.5	8.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Vietnam	1.2	2.6	3.9	4.4	9.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
China	49.1	77.1	71.1	80.8	83.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0
Indonesia	53.4	62.7	70.1	85.7	97.8	110.2	114.1	117.7	116.4	117.3	118.4	121.4	123.6	126.1	126.6	126.6
New Zealand	0.2	0.3	0.2	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Australia	87.0	88.1	99.9	105.2	109.3	114.6	125.1	128.7	135.1	140.4	141.3	143.2	146.6	149.8	153.5	155.8
Pacific Demand	196.9	221.2	235.0	256.3	278.1	284.7	288.0	292.9	297.3	303.7	302.1	305.9	316.5	326.0	329.1	331.9

COAL SOURCES

- South Africa – reserve and logistics issues
- Poland – Significant industry restructuring and reduction – net importer?
- Russia – capacity to expand if logistics and internal demand allow
- Colombia – capacity to expand but attractive source for US supplies
- UK and Germany – production down by half by 2012?
- US – low level of future exports
- China – possible exit from export markets?
- New supply sources – Venezuela, Nigeria, Mozambique and Botswana?

HISTORIC COAL PRICES

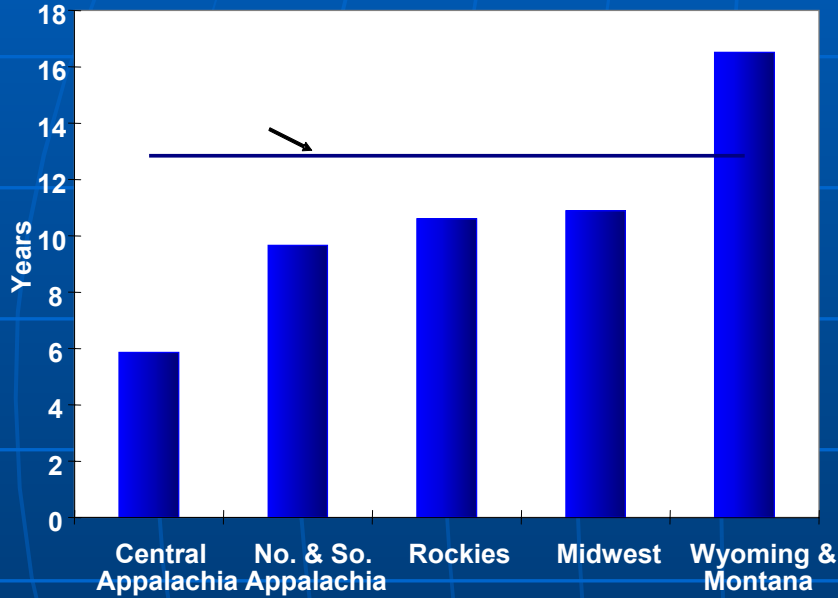
SACR INDEX VS ENEL BENCHMARK



WHAT DOES THIS MEAN?

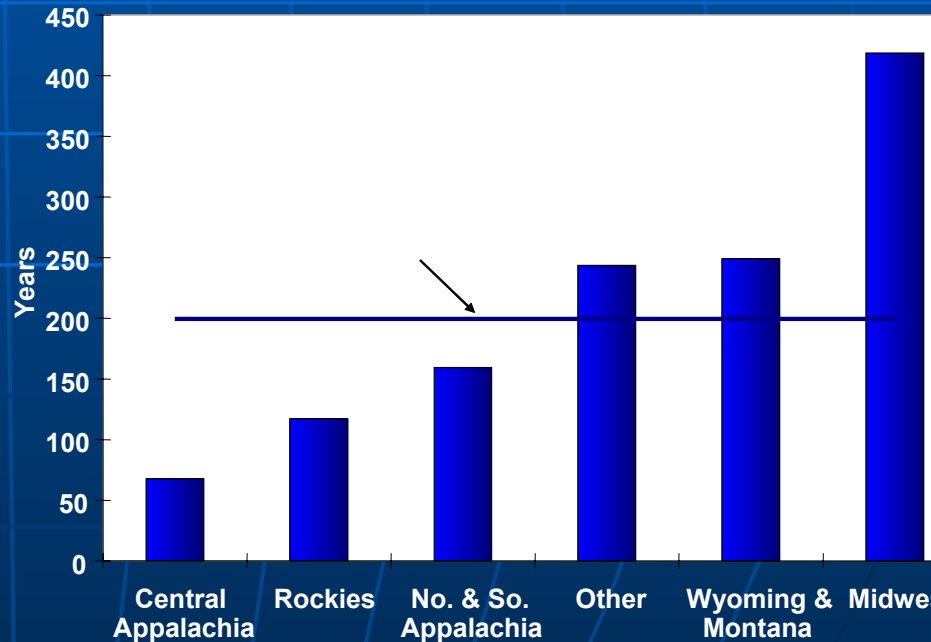
Country	2003	2013 Possible	Difference	2013 Doomsday	Difference
European production					
UK	27	20	-7	6	-21
Germany	28	20	-8	15	-13
France	2	0	-2	0	-2
Spain	13	0	-13	0	-13
Sub Total	70	40	-30	21	-49
Key exports to Europe					
Colombia	27	40	+13	25	-2
South Africa	48	52	+4	40	-8
Poland	16	7	-9	3	-13
Russia	26	35	+9	20	-6
Sub Total	117	134	+17	88	-29
Total	187	174	-13	109	-78

NORTH AMERICA



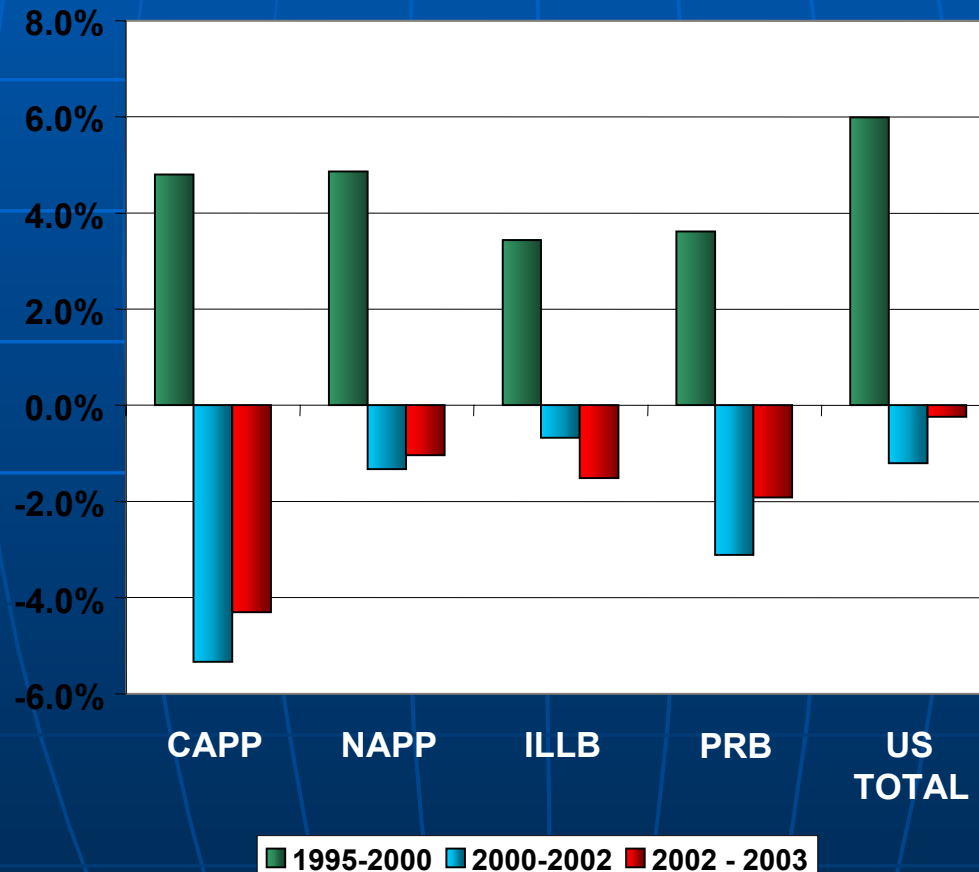
Life of existing mines

Potential reserve life



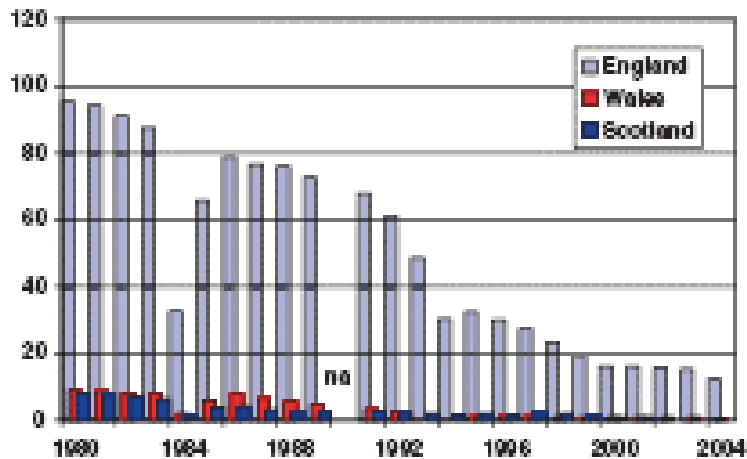
NORTH AMERICA

Declining Coal Mine Productivity



IMPLICATIONS FOR UK

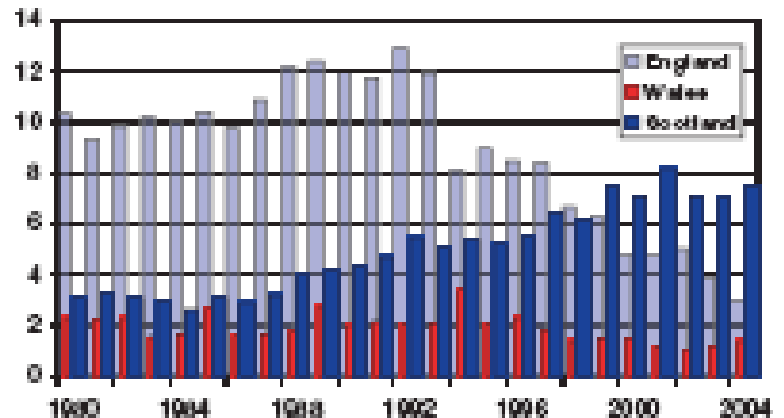
Million tonnes



**UNDERGROUND
PRODUCTION**

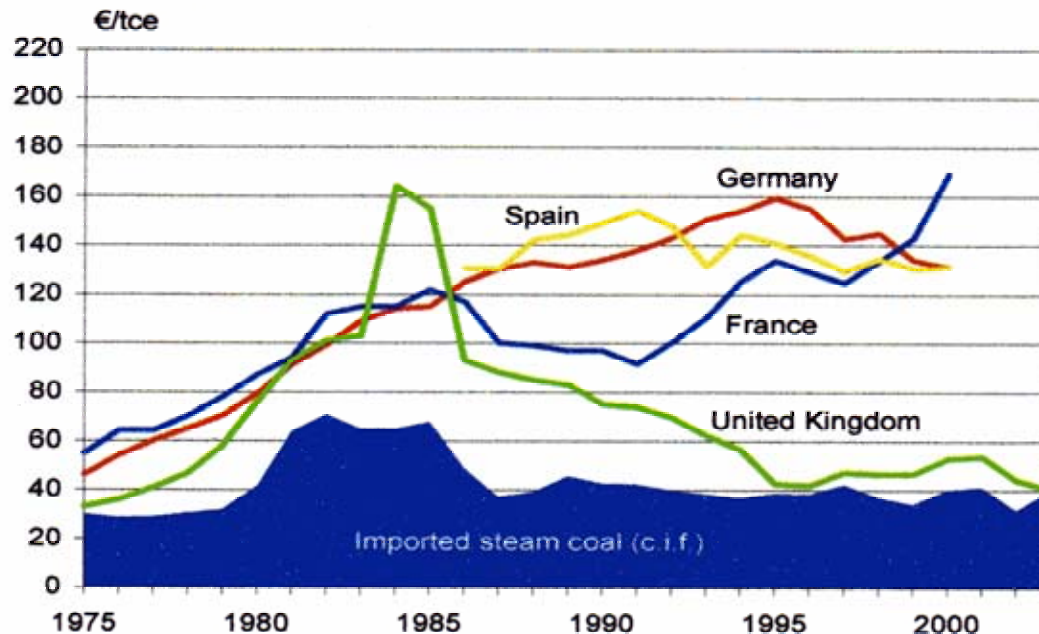
**OPENCAST
PRODUCTION**

Million tonnes



UK POSITION

Coal is a competitive fuel in the UK.



- **Coal is abundant and available from countries not subject to the political uncertainties found in many oil and gas producing nations.**
- **Prices are more stable than oil and gas, though demand from China has pushed prices up recently.**

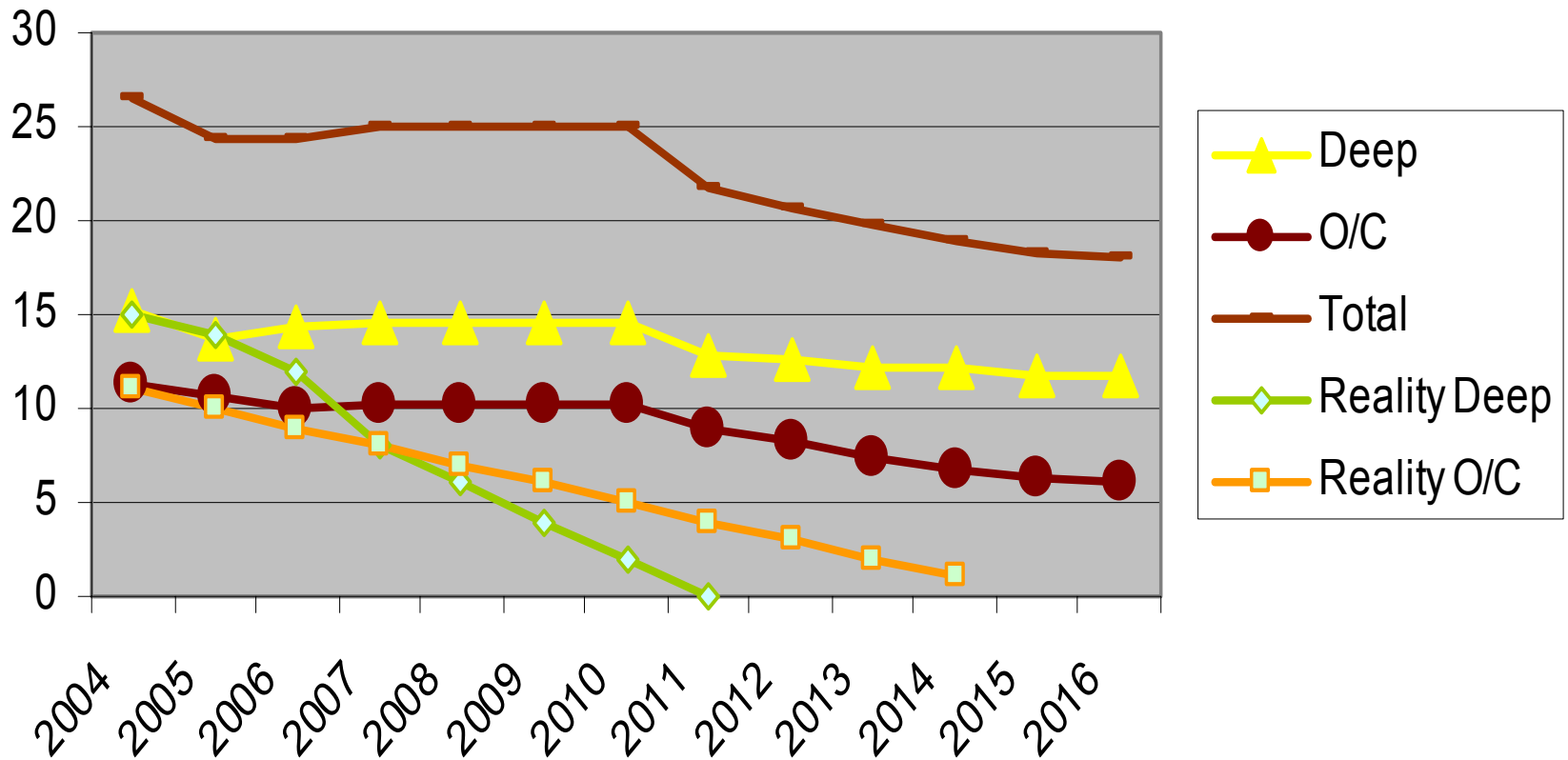
UK POSITION

- Coal costs are reasonable compared to world production costs
- Mineable resources are dwindling but still substantial
- LCPD and environmental constraints add to domestic coal's problems

UK POSITION

- Estimated reserves in licences in 2004 are summarised as;
 - Operating underground - 106mt
 - Closed underground - 226mt
 - Operating opencast - 51mt
 - Closed opencast - 2 mt
 - TOTAL*** - ***385mt***
- Life at current production rates from operating mines 6-7 years
- Estimated total reserves bituminous and anthracite 1 billion tonnes

UK FUTURE PRODUCTION



UK MINE LIFE

- Limited life after 2016
- Only Daw Mill, Harworth and Kellingley have theoretical life
- New reserves seem unlikely to gain either permission (opencast) or investment (underground)
- Two options for the UK;
 - Support the industry due to its strategic importance
 - Find new ways to extract the energy

WHAT SHOULD WE DO?

- Needs a detailed understanding of long term coal markets
- Where does UK coal fit in the world and where will it be at critical future points?
- What are the future benchmarks and can UK coal ever attain them?
- What is the real availability and cost of imported coal in the long term?
- Have coal prices made a step change that will affect the D/S outlook?
- What is the strategic value of our industry

HARD TO DETERMINE FUTURE

- Coal companies are rarely required to reveal production replacement levels
- Low exploration expenditures means many resources are not really proven
- Coal producers wish to maintain a reputation of long term reliable suppliers
- Real modelling needs to;
 - Have a detailed understanding of available reserves and at what cost they can be exploited
 - Industry drivers and real drivers

UK MINE LIFE

PRIMARY DRIVER	SECOND TIER	THIRD TIER	FOURTH TIER	CAUSAL DRIVER
Coal production technologies and productivity trends	Power demand	Gas prices	Technological developments	GDP growth
Coal reserves, reserve depletions and mine investments	Coal Prices	Coal demand	Technical development	Return on Investment
Coal power production technologies and trends	Coal cost	Coal availability and image	Rival fuel sources	Total cost of generation
Environmental policies and effect on mineability	Government commitment	Peer pressure	Cost of implementation	Development of standards
Transportation and logistics	Other industrial development	Growth policy	Ability to attract investment	Investment criteria
Emission pricing	Credit supply and demand	Fuel pricing and weather	Government policies	Public perception
Exchange rates	Country's policies	Economic performance	US economic performance	Global GDP and economy
Key regional coal demand trends	Emission controls	Economic growth	Coal use technology	Regional development policy

UK – OPTIONS

- Methane extraction;
 - Attractive in US, China, Germany and Russia
 - Potential in Mexico, India, Ukraine, Poland, Australia and Kazakhstan
 - CMM easier than CBM
 - Many projects rely on either safety issues or emission credit generation capability to succeed
 - Need strategic view of potential contribution

UK – OPTIONS

- In seam gasification
 - Potentially increase UK resources to 17 billion tonnes
 - Newer technologies offer opportunities for reserves below 600m
 - Main issues are costs and technical issues relating to uncontrolled combustion, pollutants and effects on groundwater
 - Potentially economic on a large-scale if CO₂ sequestration is added

UK – OPTIONS

- Other options, like IGCC and CO₂ sequestration will have less benefit unless coal can be mined profitably
- Better pursue solutions that extend life of UK deposits other than using conventional mining.

UK – THE IDEAL STRATEGIES

- Establish the real availability and cost of imported coal as a benchmark case
- Determine the accurate UK coal production picture under differing export coal price scenarios and stand-alone basis
- Develop a sound strategy for UK coal industry based on UK's energy needs and importance for some self-sufficiency
- Assess the viability of new technologies and support attractive options effectively