Industry Focus

GLOBAL

5 February 2008 | 56 pages

Black Gold – Coal That Is*

Commodity Outlook

- **Contract Prices to Double —** We expect 2008/09 annual contract prices for thermal and coking coal to roughly double in the current round of negotiations. Thermal coal to reach US$100/t (up from $55), and coking coal to US$200/t (up from $95).
- **Short Term Disruptions Highlight Deeper Problems —** Tight markets are being further squeezed by new developments: floods in Queensland, power crisis in China and South Africa are amplifying upward pressure on prices this year. But a much deeper problem is underlying.
- **Thermal Coal Supply to Improve Post 2010 —** The tightness in the thermal coal market will begin to ease from 2010 as port and rail bottlenecks in Australia are removed.
- **But Coking Coal Remains Tight —** Sources of additional supply of coking coal are much more difficult to identify however, and prices are expected to remain higher for longer.
- **Currency & Cost Pressures Abound —** Other factors which will boost prices include sharply increasing exchange rates in producing countries and cost increases. Production costs have been increasing 14%/yr and further cost inflation is expected, albeit at a slower rate. As a consequence we have increased our long term prices.
- **Long Term Estimates Lifted —** We have increased our long term prices to US$120/t for hard coking and US$50/t for thermal.

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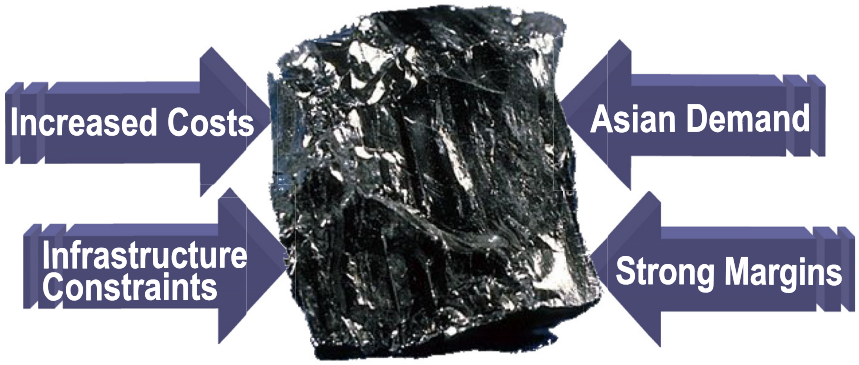
Figure 1. Coal Price Drivers



Source: Citi Investment Research

* Apologies to Jed and the Beverly Hillbillies

See Appendix A-1 for Analyst Certification and important disclosures.

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Investment Summary

Tight coal markets are being squeezed by slower growth in exports and stronger demand from Asia, exacerbated by problems in China, South Africa and Australia. We now expect 2008/09 contract prices to be US$100/t for thermal, US$200/t for coking. Semi-soft prices are likely to disconnect from traditional linkages with thermal coal and a contract price of US$145 is in prospect. PCI prices are expected to reach $170/t.

Thermal Coal

The outlook for thermal will be determined by:

- Australian port and rail constraints – Port and rail infrastructure constraints are expected to restrict Australian coal exports until at least 2010. Floods in Queensland will further reduce supply near term, although the coking coal market is most affected.
- Similar problems in South Africa – The port of Richards Bay is being expanded from 72 to 91Mt. But the rail network will be challenged to deliver the additional coal from mine to port. The recent power crisis has been triggered by short term influences (seasonally strong demand and wet weather disrupting deliveries); but has longer term implications.
- Indonesia – Nearly all future growth of Indonesian coal production will be of sub bituminous coals with a calorific vale of around 5800kcls. Many traditional thermal coal importers are capped on the proportion of low calorific value coal they can use, although this is not the case in China or India.
- China – China has transformed from a net exporter of coal to a net importer. Whether this situation is sustainable is unclear, but what is clear is that the threat of surging Chinese exports has past. The current energy crisis has been triggered by bad weather but has deeper roots. The government has banned exports until March and longer term measures are expected.
- Indian – India, like China, will depend on coal fired electricity generating capacity to power economic growth. New plants will use imported coal from Indonesia.
- Europe – At current prices coal is still competitive with gas even at higher CO_2 prices.

Our analysis points to a continued tightness in seaborne thermal markets extending to 2010. Longer term the structural characteristics of the thermal coal market do not support a radical transformation in the industry. Yet medium term barriers to entry will be supportive and the trend in thermal coal demand is considerably higher than many other commodities. As such we have lifted our long term estimates to US$50/t.

Coking Coal

The outlook for coking will be determined by:

- Australian Exports – Constrained by port and rail bottlenecks Australian shippers have been allocating port capacity preferentially to metallurgical coal exports but there is limited further scope. .
- Canadian Exports – Exports have been depressed in recent years by weaker prices especially in local currency terms, escalating costs, equipment shortages and rail constraints. New projects will add 5mt.

- US Exports - For the US to resume its importance in seaborne markets local production would have to increase sharply, overcoming considerable environmental, infrastructure and other challenges.
- China – Chinese steel production is not immune from a US recession but it is insulated. We have shaved our Chinese GDP forecasts, but steel demand will be less affected, being centered on construction and infrastructure. The sustainability of exports is an important risk (both positive and negative).
- Indian Import Demand – Indian demand will double over the forecast period, as growing steel production becomes more dependent on imported coal.
- Japanese Imports – Japan is the largest importer of seaborne coking coals. Steel production increased 2.4% at 119Mtpy, and their demand for coal is being further boosted by a need to restock.
- PCI & other substitute technologies – In periods of extreme tightness in supply, steel mills have responded by increasing consumption of semi-soft and PCI coals. However that may not be an option this time for both technical and economic reasons.
- US Dollar weakness to push prices higher – In 2008/09 contract price negotiations producers will be determined to ensure that USD prices agreed compensate for these disparities and insulate against further USD weakness.

In contrast to thermal coal, structural characters of the coking coal market are supportive of higher long term prices. Most important are the high barriers to entry – high quality coking coal is a rare geological commodity. Production cost will continue to escalate.

Figure 2. New Coal Forecasts ($US/t)

	JFY 2008(e)	JFY 2009(e)	JFY 2010(e)	JFY 2011(e)	JFY 2012(e)	JFY 2013(e)	JFY 2014(e)	LT
Coking	200.0	180.0	160.0	150.0	150.0	150.0	150.0	120.0
Steam	100.0	80.0	80.0	60.0	50.0	50.0	50.0	50.0
Semi-Soft	145.0	100.0	90.0	67.0	57.0	57.0	57.0	57.0
Low vol PCI	170.0	130.0	100.0	75.0	65.0	65.0	65.0	65.0
$/t Change yoy								
Hard coking	103	-20	-20	-10	0	0	0	
Steaming	44	-20	0	-20	-10	0	0	
Semi-soft coking	80	-45	-10	-23	-10	0	0	
Low vol PCI	102	-40	-30	-25	-10	0	0	

Source: Citi Investment Research

Figure 3. Previous Coal Forecasts ($US/t)

	JFY 2008(e)	JFY 2009(e)	JFY 2010(e)	JFY 2011(e)	LT
Coking	120.0	107.0	97.0	82.0	70.0
Steam	67.7	67.7	62.7	57.7	40.0
Semi-Soft	74.7	74.7	69.7	64.7	42.0
Low vol PCI	90.7	90.7	67.5	62.6	50.0
$/t Change yoy					
Hard coking	23	-13	-10	-15	
Steaming	12	0	-5	-5	
Semi-soft coking	10	0	-5	-5	
Low vol PCI	23	-9	-23	-5	

Source: Citi Investment Research

Thermal Coal

Short term Developments – Ballistic Prices

A tightening thermal coal market already squeezed by slower growth in Indonesian and Australian exports and stronger demand from Asia has been hit by a series of weather related disruptions to supply which conceal deep rooted problems.

Asian spot prices are moving dramatically higher and reported to be between US$110 and $130/t FOB Newcastle.

FOB Richard Bay prices (API 4) are now over US$117/t. European delivered prices, CIF ARA (API 2) are reported at US$141/t.

The recent heavy rains in Queensland have resulted in substantial short term disruptions to operations. At the Ensham mine, an 8Mtpy thermal coal producer, the pit was flooded. 2Mt of thermal coal production will be lost. Coking coal production is likely to be even more severely affected with many producers declaring force majeure. We estimate 4-5Mt of coking coal production will be lost.

In South Africa a coincidence of peak seasonal demand, maintenance shutdowns, and wet weather hampering coal deliveries, forced Escom to shed 4GW of power, curbing supply to heavy industrial users, including mines. Power has subsequently been partially restored but there is no guarantee of continuity. These disruptions have uncovered a deeper problem- lack of investment in electricity generating capacity- which will not be resolved until at least 2012-13. Impacts on the coal markets have been two-fold: disruptions to production and redirection of coal from export to domestic consumption.

In China bad weather (snow storms and drought) have triggered a power crisis. Half of the provinces are encountering brown outs and power supplies to industrial uses including smelters have been interrupted. Again these developments have brought to the surface a deep rooted problem of power tariff caps, low coal prices, coal production curtailment and infrastructure bottlenecks.

There has been some movement towards settlement of Japanese Financial Year prices. Chinese shippers are understood to have settled for small tonnages of 5800 Kcal coal at US$98/f FOB.

In early exchanges between one producer and Japanese utilities the range of prices demands was high 90's-low 100's from the producers, low 90's from the consumers. In light of recent disruptions and movements in spot prices we now expect contracts to settle at $US100/t.

Medium term Outlook – Tightness till 2010

The medium term outlook will be determined by:

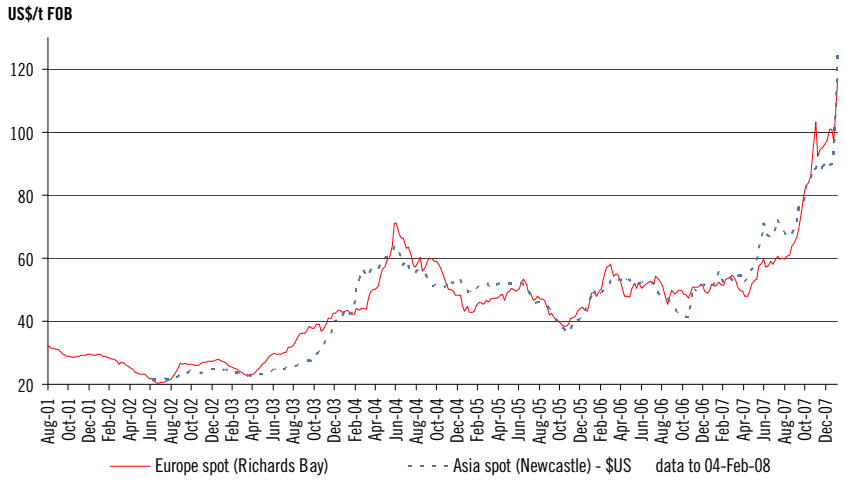
- Australian port and rail constraints
- Similar problems in South Africa
- Indonesia's ability to continue to increase exports.
- China transforming from an exporter to an importer
- Indian demand for imports as domestic production fails to keep pace.

- Demand from Europe under increasing carbon constraints

Our analysis points to a continued tightness extending to 2010.

Asian prices have increased to ~$90

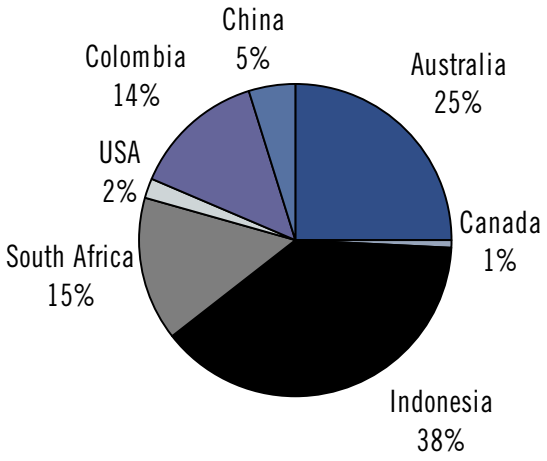
Figure 4. Asian & European coal prices



Source: Global Coal, Citi Investment Research

Supply

Figure 5. Australia, Indonesia and South Africa account for 80% of supply



Source: Australian Bureau of Statistics, Tex report, Citi Investment Research

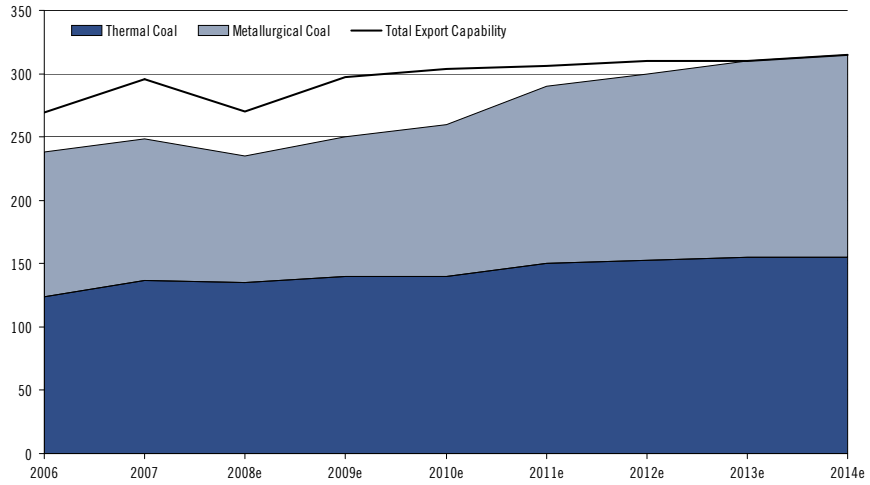
Australia – port and rail bottlenecks

Australia exported 250Mt of coal in 2007 (45% thermal, 55% metallurgical), a paltry 10Mt more than in 2006. Disruptions to shipments through the port of Dalrymple Bay have worsened recently, forcing a major supplier to declare force majeure. Australian shippers are allocating port capacity preferentially to high value metallurgical coal exports which are up 13Mt; thermal coal exports have fallen by 3Mt as a consequence.

Exports will increase only modestly until 2010, and even after that persisting low infrastructure utilisation rates will mean exports will increase to 300Mt by 2012.

Infrastructure bottlenecks mean Australian exports will not reach mine capability until 2012

Figure 6. Australian Coal Exports and Mine Production capability (Mt)



Source: Australian Bureau of Statistics, Citi Investment Research

Port and rail infrastructure constraints are expected to restrict Australian coal exports until at least 2010. Although some relief will come with the completion of port expansion at the end of 2008, rail bottlenecks are set to persist.

Port capacity utilization has approximated 70-80% over the last 3 years. Expanded ports capacities will take time to deliver and persisting rail bottlenecks will keep port utilisation at a low level.

Figure 7. East Australian Port Capacities

Port	*Capacity as at 31 Dec 2007 (Mtpa)*	*Planned Capacity by 2012 (Mtpa)*
New South Wales		
Port Waratah Coal Services	102	120
Newcastle Coal Infrastructure Group	-	30
Port Kembla	16	16
Queensland		
Abbot Point	21	50
Brisbane	5	5
Dalrymple Bay	68	85
Hay Point	44	44
Gladstone	75	>75
Total	**331**	**425**

Source: Tex Report -Australian Government Study

At Newcastle, PWCS plan to expand capacity at their two terminals to 113 Mt by year end 2008. An additional 30 Mt is planned to be available from NCIG in 2010. But potential coal supply will be some 13 Mt more than the combined port capacity.

Rail expansion plans for Queensland are detailed in Figure 8.

Figure 8. QLD's Port & Rail Expansions

Qld Infrastructure Projects	Company	Location	Expected startup	New capacity	Capital expend
Blackwater to Burngrove Duplication (rail)	Queensland Rail	Blackwater to Burngrove	late 2007	system capacity increase of 4Mtpa	$43m
Callemondah to RG Tanna 3rd Spur	Queensland Rail	Gladstone	mid-2008	na	$40.5m
Dalrymple Bay Coal Terminal 3rd Rail Loop	Queensland Rail	Dalrymple Bay	late 2009	throughput capacity increase of 29 Mtpa	$83.4m
Dalrymple Bay Coal Terminal 7X expansion project Phase 1	Babcock & Brown Infrastructure	Dalrymple Bay	early 2008	port capacity increase from 60 to 68 Mtpa	$600m
Dalrymple Bay Coal Terminal 7X expansion project Phases 2/3	Babcock & Brown Infrastructure	Dalrymple Bay	late 2008	port capacity increase from 68 to 85 Mtpa	$700m
RG Tanna Coal Terminal expansion	Central Queensland Ports Authority	Gladstone	progressive staged increases to end 2007	terminal capacity increase from 40 Mtpa to 68 Mtpa	$800m
Abbot Point Coal Terminal X25 expansion	Ports Corporation of Queensland	Bowen	2010	port capacity increase from 21 Mtpa to 25 Mtpa	$90m
Abbot Point Coal Terminal X30 expansion	Ports Corporation of Queensland	Bowen	na	port capacity increase from 25 Mtpa to 30 Mtpa	$390m
Abbot Point Coal Terminal X35 expansion	Ports Corporation of Queensland	Bowen	na	port capacity increase from 30 Mtpa to 35 Mtpa	$140m
Abbot Point Coal Terminal X50 expansion	Ports Corporation of Queensland	Bowen	na	port capacity increase from 35 Mtpa to 50 Mtpa	$150m
Grantleigh Tunnel	Queensland Rail	70 km W of Rockhampton	late 2009	na	$53.5m
Hay Point Coal Terminal Phase 3	BHP Billiton Mitsubishi Alliance (BMA)	20 km S of Mackay	na	port capacity increase from 44 Mtpa to 55 Mtpa	$500m
Jilalan Rail Yard Upgrade	Queensland Rail	35 km S of Mackay	late 2009	na	$350m
Northern Missing Link (rail) (stage 1)	Queensland Rail	North Goonyella to Newlands (70 km)	2010	10 Mtpa haulage capacity (stage 1)	$440m
Northern Missing Link (rail) (stage 2)	Queensland Rail	North Goonyella to Newlands (70 km)	na	5 Mtpa haulage capacity (stage 2)	$140m (includes electrification)
Stanwell -Wycarbah upgrade	Queensland Rail	40 km W of Rockhampton	mid 2009	na	$71.5m

Source: Tex Report

A recent proposal is for the expansion of Port Alma (Wiggins Island), a general cargo port adjacent to Gladstone in central Queensland into a 25-30Mtpy coal export facility, by 2012. Two further expansion phases are planned taking ultimate capacity to 84Mtpy.

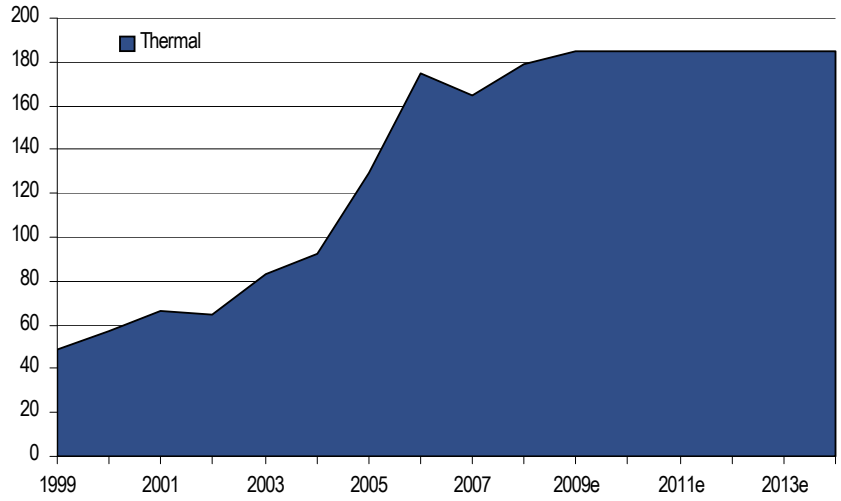
Indonesia - mind the gap

Indonesia has emerged as the world's largest exporter of thermal coal, filling the gap left by constrained exports from Australia and South Africa and China's transformation from an exporter to an importer.

The ability of Indonesian exports to continue to increase is critical to the thermal coal market outlook. It will be determined in the balance between rising domestic demand and increasing supply, but coal quality will also be a critically determining factor.

Indonesian exports will plateau at 10mtpy

Figure 9. Indonesian Thermal Exports



Source: Tex report, Citi Investment Research

Domestic demand growth will be below expectations

In 2006 the Indonesian government announced an aggressive expansion of coal fired electricity generation capacity. 10 GW are to be added by 2010 and 45GW by 2020, requiring an additional 120Mt of coal. Already these plans are subject to delay however, and in October 2007 the 10MW addition scheduled for 2009 was delayed until 2025. The problems in securing additional electricity generating capacity center on government approvals and financing.

Government plans are for exports to stabilize at around 150Mtpy. But we expect levels to be higher, given the probability that domestic demand will fall short of projections.

Coal quality is a marketing challenge

Indonesian coal resources are very large – 61bn tonnes but only 14% have a calorific value of more than 6100kcal. Much of the high calorific value (6700kcal) coal production from existing operations is committed under existing contracts, and there are limited options to produce more.

The coals are high in moisture which increases transportation costs and makes them susceptible to spontaneous combustion.

Indonesian coals have some important redeeming features however - they are low in sulphur and low in ash, making them ideal for blending purposes.

Nearly all future growth of Indonesian coal production will be of sub-bituminous coals with a calorific vale of around 5800kCal. Many traditional thermal coal importers are capped on the proportion of low calorific value coal they can use, but this is not the case in China or India. In China the low sulphur low ash Indonesian coals are ideal for blending with local coals. In India the new ultra mega coal fired electricity generating plants will be optimized around the use of Indonesian coal.

Upgrading is another route Indonesian producers are exploring to increase the market acceptance of low calorific value coals.

South Africa

Thermal coal exports from South Africa have been constrained by a situation of port and rail bottlenecks very similar to that in Australia. The port of Richards Bay is being expanded from 72 to 91Mt. But the rail network will be challenged to deliver the additional coal from mine to port.

The recent power crisis has been triggered by short term influences (seasonally strong demand and wet weather disrupting deliveries), but a much deeper supply demand problem is underlying which is unlikely to be resolved until 2012 or so. As a result coal production could be disrupted and potentially, destined for export may be diverted to the domestic market.

Where will the additional supply come from?

Our supply demand analysis points to a widening supply shortfall. We expect higher prices as a result but additional supply (or reduced demand) will be an inevitable consequence.

Potential sources of additional supply include:

- Russia (although rail bottlenecks are a serous constraint);
- China - a wide disparity between domestic and international prices could induce exports (infrastructure and government measures permitting);
- Vietnamese exports of anthracite are increasing sharply, but domestic demand is increasing;
- North Korea has also boosted exports to China;
- Mozambique - significant thermal coal will be produced at the coking coal projects;
- Columbia - supply has persistently disappointed, but a change in ownership at Drummond may encourage further investment. El Descanso (25Mtpy) is due on stream in 2010, but further infrastructure is needed.

Demand

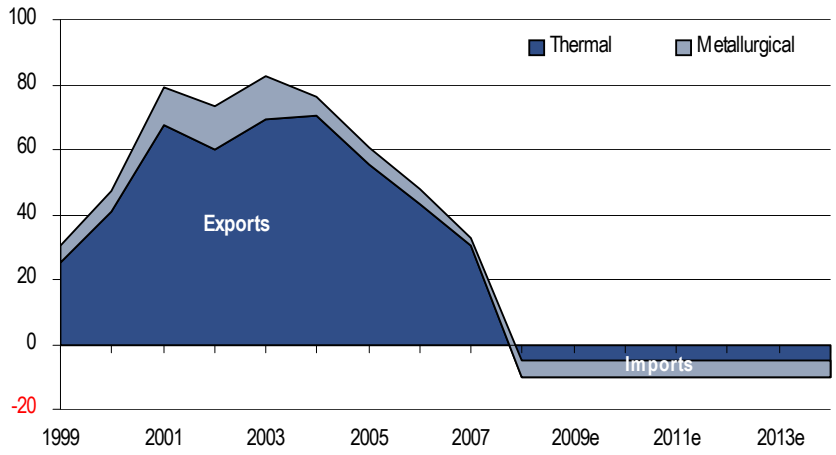
China – A sustained importer

China has transformed from a net exporter of coal to a net importer. Whether this situation is sustainable is unclear, but what is clear is that the threat of surging Chinese exports is past.

In the short term the energy crisis in China will preclude any resurgence in exports. Electricity brownouts are now occurring in half of the Chinese provinces. The immediate catalyst is bad weather, boosting demand and disrupting supply. But the origins are more deep rooted: restrictions on power tariffs and closures of coal mines.

The government has acted to prevent coal producers exporting coal by banning exports until March. Further longer term measures can be expected to be implemented subsequently.

Figure 10. China Coking & Thermal Net Exports



Source: Coalfax, Platts, Citi Investment Research

China exported a net 30Mt of seaborne thermal coal in 2007 (Figure 12). But it was a net importer if anthracite imports from Vietnam are included, Vietnamese exports may be curtailed in coming years given its domestic power demand increases.

Making a call on whether China will remain a net importer is difficult given that production is 2 billion tonnes per year and international trade less than one percent of that. However a number of factors point in that direction: strong demand, a geographical shift in the center of production, and declining quality. A boom in international prices is the biggest risk to resurging exports.

Coal fired electricity generation capacity growth

China's energy white paper released by the information office of the state council on December 26 continues a focus integrated coal mine and powers station development. 13 national coal bases will be constructed. Consolidation will be also encouraged and small inefficient coal mines will be shutdown.

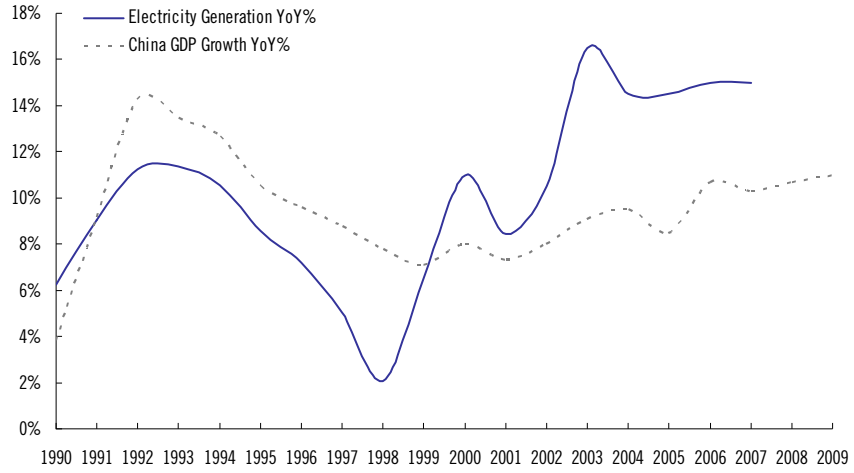
Power markets in China are tightening. In the short term this is highlighted by the impacts of recent adverse weather (snow and drought) forcing power cuts in half of the provinces.

Energy intensity analysis provides a perspective in the longer term outlook for energy demand in China. The intensity of electricity generation to GDP has been around 1.5 since the "tipping point" of 2002. This implies a continuing trend growth rate in electricity demand of around 15%/yr while China remains in its current phase of highly industrializing economic growth.

We project a 14% capacity growth in coal fired electricity generating capacity in 2008, followed by 13%pa growth until 2014.

China's electricity demand is growing at 1.5 times GDP

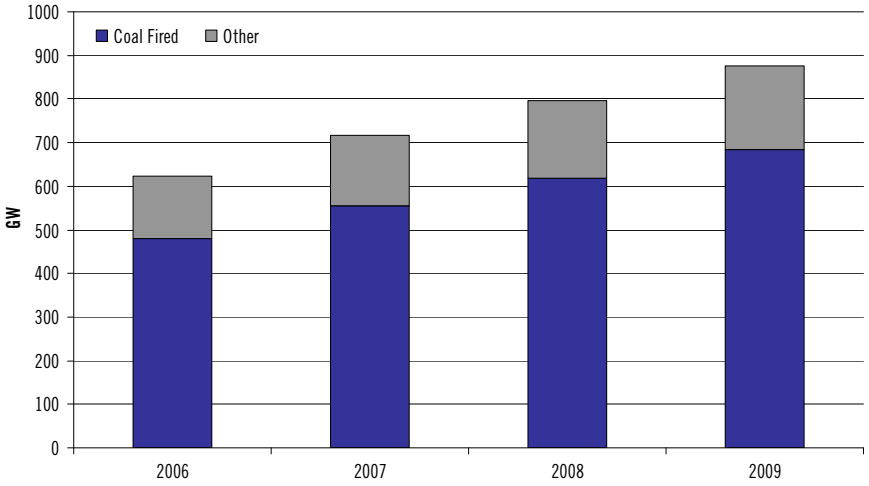
Figure 11. Electricity Generation and GDP Growth in China



Source: China Statistical Yearbook, Citi Investment Research

More than three quarters of China's electricity generating capacity is coal fired

Figure 12. China's Electricity Generating Capacity



Source: China Statistical Yearbook, Citi Investment Research

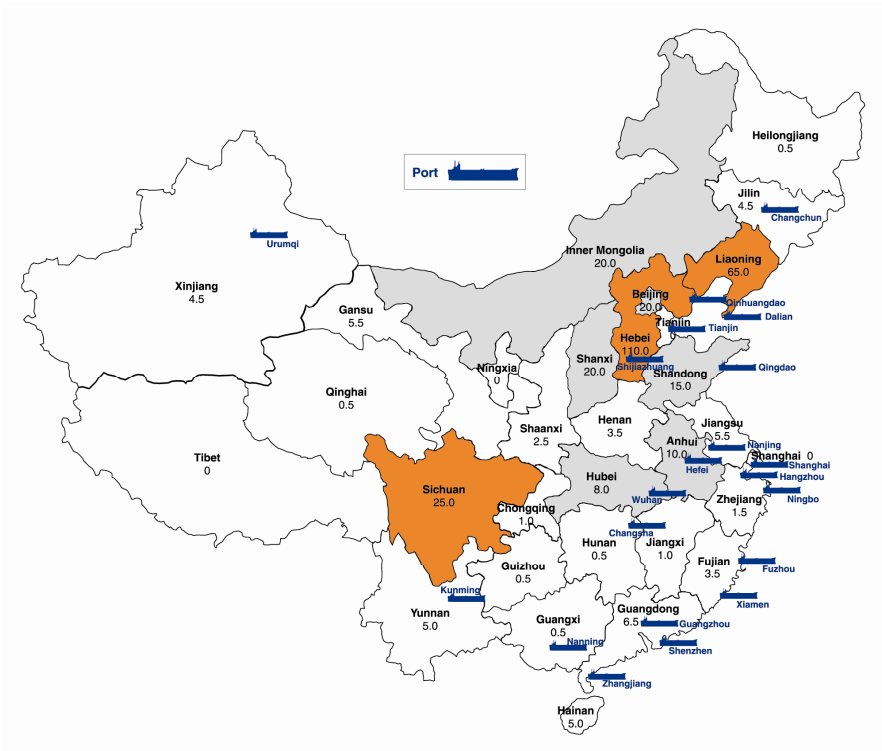
Coal supply can't keep pace

The NDRC recently forecast that electricity demand would reach 3700 billion kWh in 2008, a 13.5% increase.

The corresponding coal demand in 2008 would be 2.76 billion tonnes, up 20%. Planned expansions could allow production to reach 2.9 billion tonnes, a 26% increase, if fully implemented. Further slated expansions would add a further 600Mtpy by early next decade.

But it is not clear that rail infrastructure will be up to moving the increased supply. Geographical shifts in the center of coal mining to the west are making exports even more demanding of infrastructure. There are constraints on both track and availability of rolling stock.

Figure 13. China's coal provinces



Source: Citi Investment Research

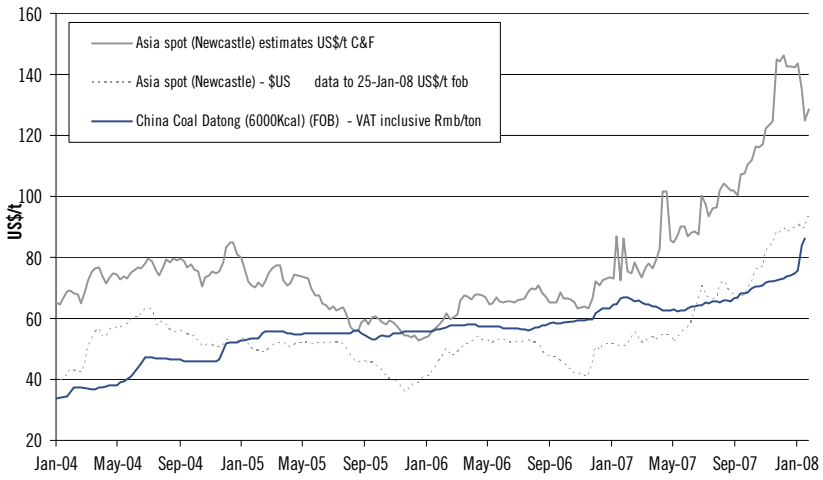
Declining coal quality will necessitate imports for blending purposes.

Booming international prices are the most important factor which could induce an increase in Chinese exports, especially if domestic prices fail to keep pace. (Indeed this occurred in late 2007).

Recent proposals to cap domestic prices might exacerbate the risk of increased exports. However, the government has already acted to ban exports until March and it would seem likely that the government would impose export quotas and export taxes as longer term measures.

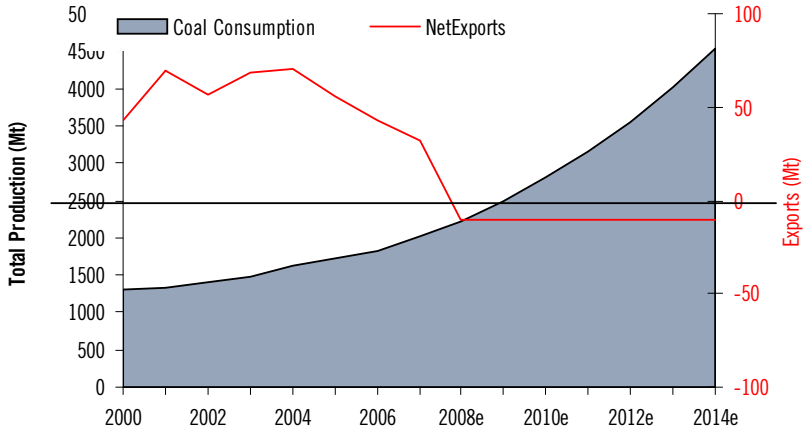
Chinese price rises lag international markets

Figure 14. Chinese domestic and Asian Prices



Source: Global Coal, Coal World, Citi Investment Research

Figure 15. China's Thermal Coal Supply & Imports



Source: Coalfax, Platts, Citi Investment Research

India

India, like China, will depend on coal fired electricity generating capacity to power economic growth.

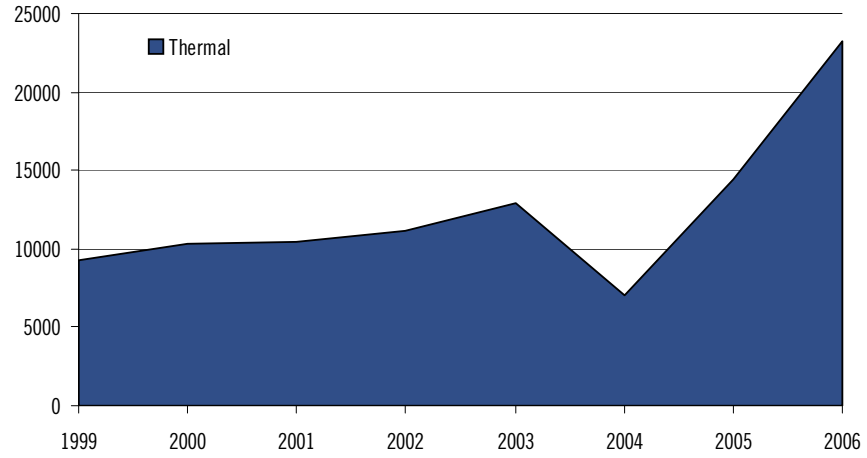
The 11th long term economic development plan includes the construction of 78.5GW of new electricity generating capacity by 2012, of which 40MW will be coal based. Ten "Ultra-mega" power plants, each with an average capacity of 4GW, built and constructed by corporates, will contribute about half of the new capacity.

Critical for international coal markets is that six of the ultra-mega plants will use imported coal, and that these plants are being designed to accept low calorific value coal from Indonesia. There are a number of challenges to the

successful implementation of these projects including government permitting, and private financing, as well as the resolution of operational problems like transmission losses. In constructing our forecast we have assumed a 70% probability factor that these projects proceed.

India's imports have doubled and are set to double again

Figure 16. India's Thermal Imports



Source: Coalfax, Platts, Citi Investment Research

Japan – improving demand

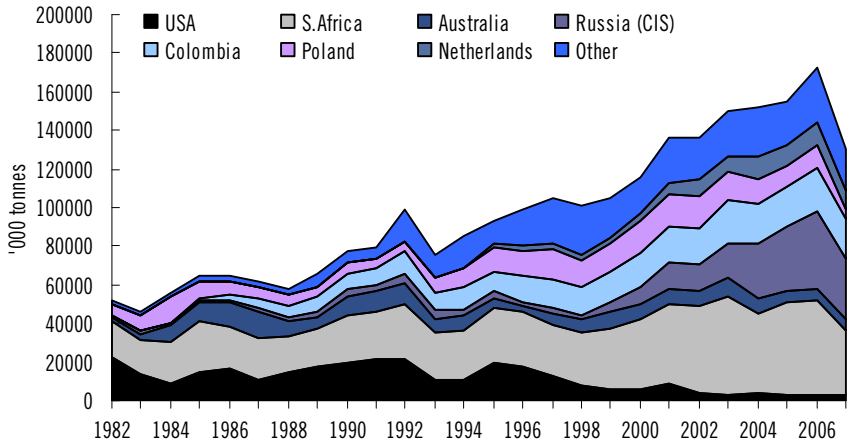
Japanese imports have increased strongly, as generation from coal fired power stations offsets reduced nuclear output following a recent earth quake and other operational problems.

Europe

European imports declined in 2007Q4 in response to sharply higher coal prices and expectations of higher CO_2 prices. In the UK coal imports declined by 22% in Q307 yoy as gas-fired power generation increased.

European coal inputs fell in 4Q07 with high freight rates

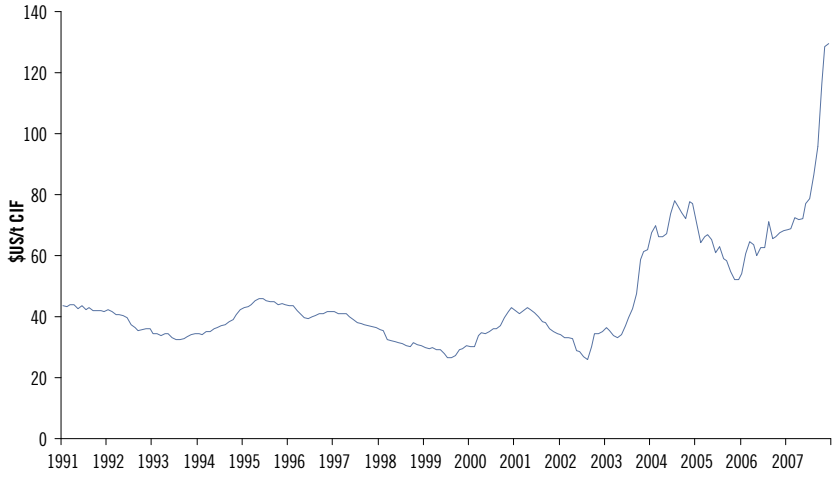
Figure 17. European Thermal Coal Imports



Source: Euro Stat, Citi Investment Research

Delivered prices spiked with high FOB prices and freight rates. Latest quotes are US$141/t

Figure 18. Thermal Coal prices - ARA



Source: International Coal Report, Citi Investment Research

Competitive position of coal in a carbon constrained world

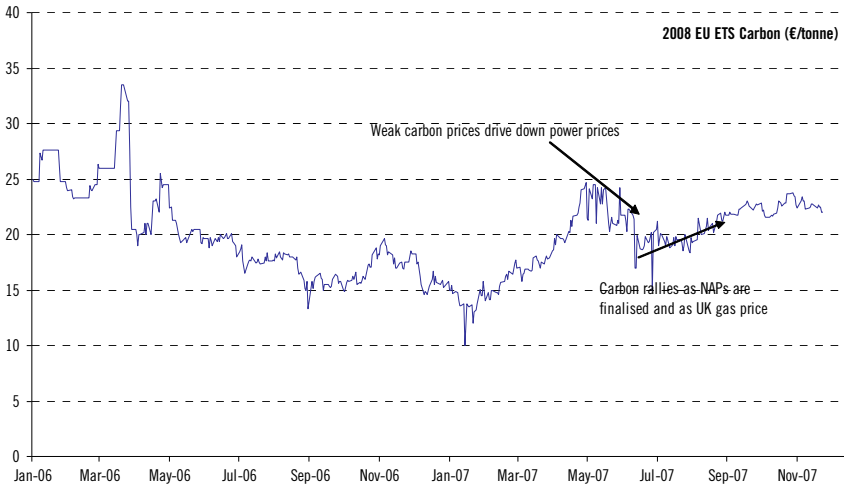
Even in a carbon constrained world we believe coal demand will continue to grow strongly, powered by increasing coal fired electricity generating capacity in the developing Asian giants, especially China and India.

European demand on the other hand will be greatly influenced by coal's competitive position vs. gas under increasingly stringent carbon constraints. (Coal fired power stations emit nearly twice as much CO_2/kWh as gas stations).

Phase 2 of the EU emissions trading system (with more stringent emissions caps) began trading in January 2008. Spot CO_2 prices leapt from virtually zero, under Phase 1 to Euro23/t under phase 2. Futures trading indicates likely CO_2 prices of around Euro$20-25/t.

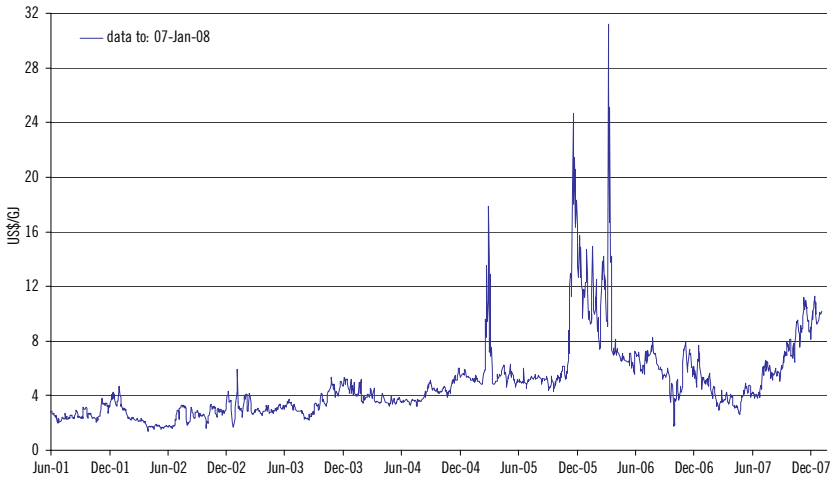
CO_2 prices in ETS2 are around Euro 22/t

Figure 19. 2008 Carbon Prices EU ETS 2 – Euro/t



Source: Bloomberg, Citi Investment Research

Figure 20. European Gas Prices are rallying in line with oil

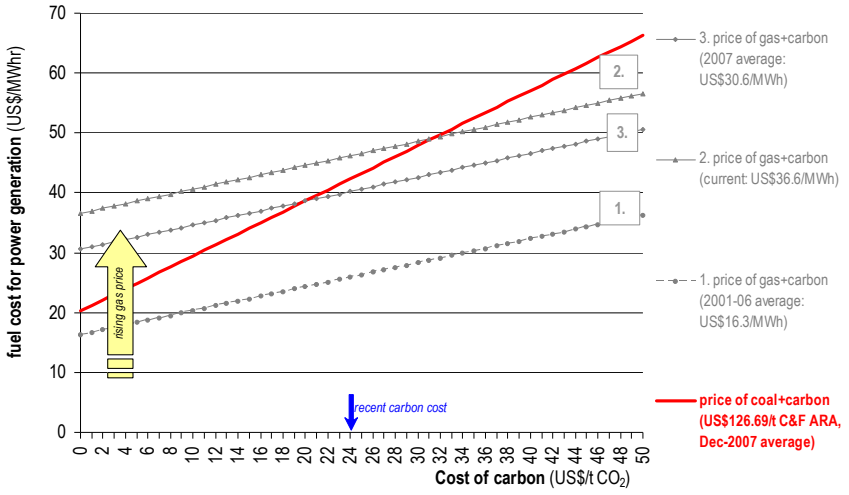


Source: Bloomberg

Figure 23 shows that at current gas prices coal is completive with gas at CO_2 prices up to US$30/t. At the 2007 average gas price coal is competitive only at CO_2 prices below US$20/t.

At current prices coal is competitive with has at CO_2 prices up to US$30/t (currently $24/t)

Figure 21. The competitive position of coal vs gas at various costs of carbon



Source: Citi Investment Research

Coal to liquids (CTL)

Demand for coal for CTL could be an important source of future growth.

Until recently only oil has been able to supply the liquids required for transport. This is changing with coal to liquids and gas to liquids technologies. There are two important drivers behind the increasing interest in CTL:

- Reduced dependence on imported oil; and
- Concentration of emissions at the fuel production site, making them amenable to carbon capture and storage.

CTL processes consume 3.5-4t coal per tonne of product.

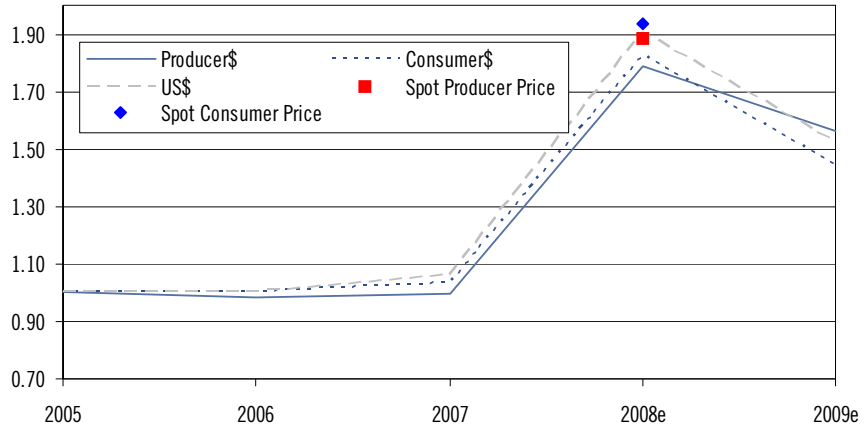
Supply – Demand and Price Outlook

The supply demand balance is set to remain tight until 2010, as a consequence of increasing Indian demand, Chinese imports and restricted supply growth from Australia and South Africa. Beyond 2010 we expect the supply bottlenecks to ease, balancing the market.

Besides the supply/demand balance other factors will contribute to price determination, and most of them point to sharply higher prices. The most important factors are: exchange rate influences and the gap between spot and contract prices.

Exchange rate influences

Figure 22. Thermal Coal "Producer" and "Consumer" Prices



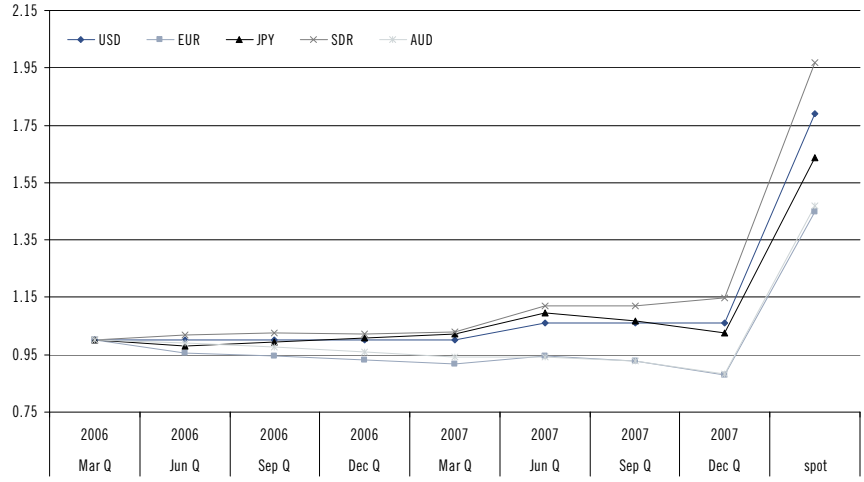
Source: Bloomberg, Citi Investment Research

In 2007 USD contract prices increased 6%, but the average weighted price received by producers increased only 2%, and in AUD terms prices fell 2.9%.

Producers will want to ensure that 2008 USD prices adequately offset a weaker USD.

USD prices have increased 80% recently but prices for most producers and consumers have increased less

Figure 23. Thermal Coal Prices in Consumer Prices



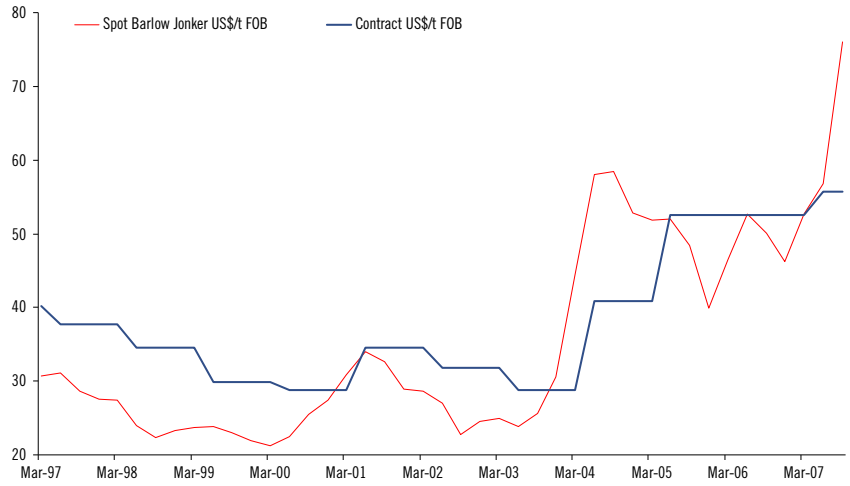
Source: Bloomberg, Citi Investment Research

Relations between spot and contract prices

The recent dramatic increase in the gap between spot and contract prices points towards an increase in contract prices. We would expect increased contact prices to close the gap.

The widening gap between spot and contract prices points to higher contract prices

Figure 24. Thermal Coal Spot and Contract Prices



Source: Global Coal, Citi Investment Research

Metallurgical Coal

Recent price developments

The metallurgical coal spot market although thin, is clearly signalling acute market tightness. Our projections also point to a chronic supply shortage.

Indian steel mills are the largest buyers of metallurgical coals in spot and tender markets, and US spot sales into Indian are the most significant price signal.

Australian spot sales have been reported as high as US$200/tFOB into India.

In early rounds of contract negotiations Xstrata offered US$210/t. However this was before the floods in Queensland. We expect prices to be set at US$200/t.

One reason why prices may be set lower is concerns about inducing new supply in Queensland, especially projects owned by new entrants but adjacent to existing operations.

Low vol PCI prices are bounding higher with recent reports as high as US$146-150/t into Brazil, up from US$85 in 4Q2007. Contract sales are believed to have been made by Foxliegh to Asian customers at US$120FOB.

We expect low vol PCI contract prices to be set at US$170/t.

Semi-soft prices are likely to disconnect from traditional linkages with thermal coal. Recent transactions indicate that a contract price of US$145 is in prospect.

In 2004-05 the contract price of hard coking coal leapt US$66 to US$125/t. At that time however, one of the steel mills responses was to increase PCI and semi-soft consumption. That option may not be available this time because of technical constraints.

Clearly contract prices are set to move sharply higher against this background, and we now expect JFY prices to settle around US$200.

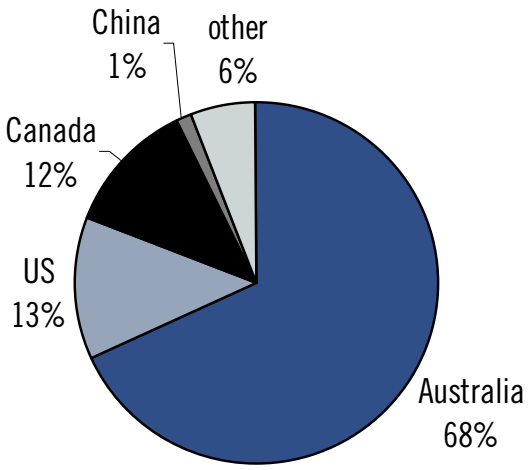
Supply

Supply by region

Australia dominates seaborne export of coking coal. Canada and the US are distant second. Our forecast points to a chronic shortage of supply and an important consideration is where the new supply will come from.

Australia dominates supply

Figure 25. 2006 Coking Coal Supply



Source: Coalfax, Platts, Citi Investment Research

Australia

Australian exports are constrained by the port and rail bottlenecks detailed in the thermal coal section of this report.

Australian shippers are allocating port capacity preferentially to high value metallurgical coal exports which are up 13Mt (thermal coal exports have fallen by 3Mt as a consequence). However there is only limited capability to further increase coking coal exports.

Symptoms of the grave concern steel makers have is the recently convened conference between steel producers, shippers and port and rail managers to resolve infrastructure problems.

Canada

Canada is the distant second largest shipper of metallurgical coal after Australia.

Exports have been depressed in recent years by weaker prices especially in local currency terms, escalating costs, equipment shortages.

Potential new projects could add 8Mt of new metallurgical coal supply, including 2Mt of PCI.

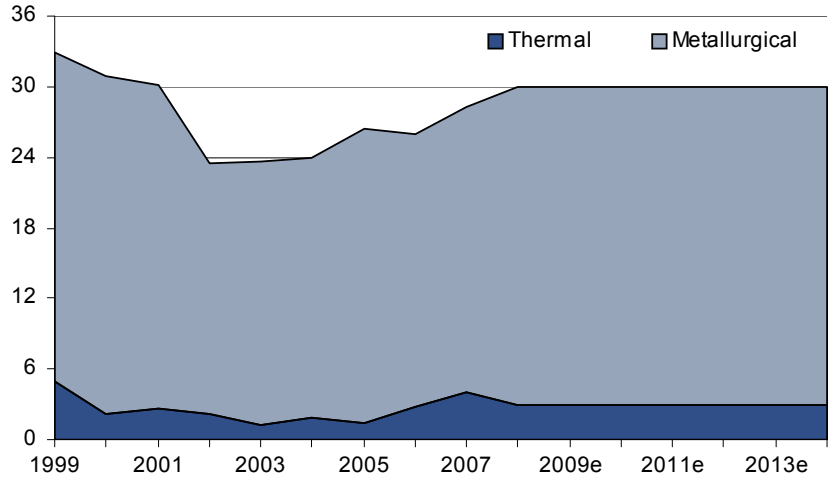
Figure 26. Canadian Coal Projects

Project Name	Proponent	Location	Production Capacity (Million MT/Y)	Type of Coal
AESWapiti	Hillsborough Resources Ltd.	Tumbler Ridge, B.C	*	Bituminous Steam
Dodds-Roundhill Gasification	Sherritt and the Ontario Teachers Pension Plan	Edmonton, Alberta	*	Subbituminous
Donkin	Xstrata Donkin Mine Development Alliance	Sydney, Nova Scotia	*	Bituminous Steam
Gething	Dehua International Mines Group Inc.	Henderson's Hope, B.C.	2.0	Bituminous Coking
Hermann	Western Canadian Coal Corp.	Tumbler Ridge, B.C.	1.0	Bituminous Coking, PCI
Horizon	Peace River Coal	Tumbler Ridge, B.C.	1.6	Bituminous Coking
Lodgepole	Cline Mining Corp.	Fernie, B.C.	2.0	Bituminous Coking
Mount Klappan	Fortune Minerals Ltd.	Skeena, B.C.	1.5	Anthracite
Shand	SaskPower Inc.	Estevan, Saskatchewan	*	Lignite

Source: Tex Report - Natural Resources Canada

Canadian exports are stable

Figure 27. Canada's coal exports (mt)



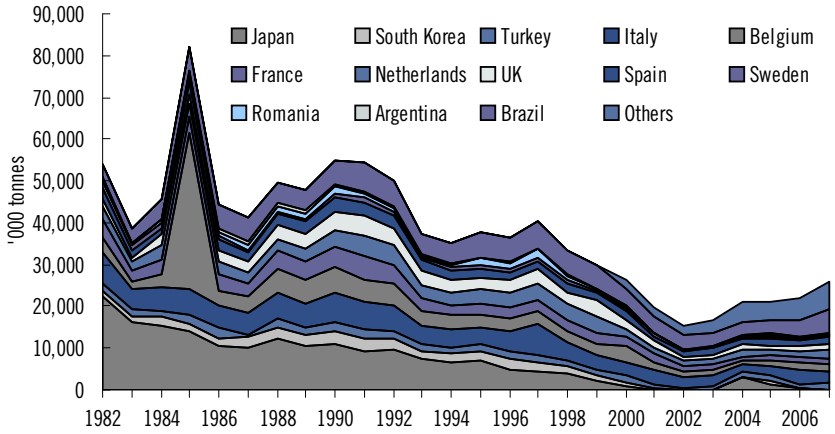
Source: Coalfax, Platts, Citi Investment Research

USA

The US is a swing supplier into export markets. Sales are predominantly into Europe and Latin America (and Canada by rail). Asian sales are mainly opportunistic spot sales to India.

US exports are unlikely to reach past levels

Figure 28. USA Coal Exports



Source: FTICR/Tex/ICR

For the US to resume its former importance in seaborne markets local production would have to increase sharply, (overcoming considerable environmental challenges), port capacity would have to expand (at Hampton Roads capacity previously used for coal is now dedicated to other cargoes), and domestic demand would have to ease.

Potential New Sources of Coking Coal Supply

Indonesia

Although Indonesian coal is predominantly thermal coal, there are metallurgical coal reserves in the Maruwai area in Central Kalimantan.

Semi-soft coal has been mined on a relatively small scale by MGM since 2004. The world's largest coking coal producer has a large project in the area. However infrastructure and transport challenges are considerable (250km road haul and 500km by river barge) and the company appear to have shown little recent enthusiasm.

Proposed projects in the Maruwai area could add 17.5Mt to supply.

Mongolia

Mongolia's undeveloped coal reserves are estimated to contain combined reserves exceeding 10,000 Mt. Current annual coal production is only ~5mtpa of thermal coal.

Tavan Tolgoi

Mongolia's government is claiming control of a US$2 billion coal project currently owned by a consortium have all been in talks regarding development.

Tavan Tolgoi is about 150km from the Chinese border and 400km from the nearest rail-line with resources of ~1500Mt of coking coal and 3600Mt of thermal coal. Energy Resources claim it can produce as much as 30Mt/y for at least 30 years.

Chandgana Khavtgai

Red Hill estimate resources for its Chandgana Khavtgai project to be 678.4 Mt.

Ovoot Tolgoi

Ovoot Tolgoi is located in southern Mongolia, next to the existing MAK/Qinhua coal mine, approximately 45km north of the Mongolia/China border. SouthGobi Energy Resources has received a mining licence for an open-pit coal mine at Ovoot Tolgoi.

Mozambique

Mozambique (the western province of Tete) is one of the largest undeveloped coking coal regions in the world. The coal is a mixture of hard coking, high and low quality thermal. It is well located to service the Indian market.

The two key projects in the area:

- Vales US$1.2 Moatize coal project in Mozambique's western Province of Tete. The Moatize mine, extensively damaged during Mozambique's civil war in the 1970s and 1980s, is believed to hold about 2.4 billion tonnes of coal reserves. Vale expects to begin production in 2010, with estimated annual output of about 12 million tonnes of coal; and
- Riversdale is planning a project which will ultimately produce 15-20Mtpy of coal of which half would be hard coking .Reserves are around 2 billion tonnes. Initial production of 7Mtpy is scheduled for 2010. Production costs are likely to be in the region of US$50/t.

A recent site visit by our team highlighted the challenges faced by the Mozambique projects, in particular, the still limited exploration drilling, coal quality and infrastructure.

A critical issue is the development of the rail link. Current capacity is 10Mtpy, and the World Bank in consortium with Indian interests are proposing to fund an upgrade to 18Mtpy.

Demand

China – to remain an importer?

China's transformation from an exporter to an importer has bean a key factor tightening international coal markets.

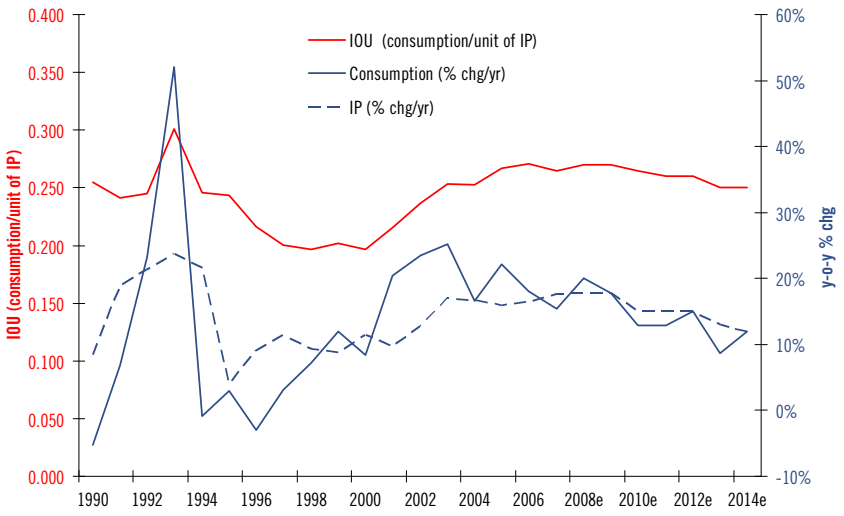
The supply demand balance of metallurgical coals in China will be determined by: domestic demand, international trade and local met coal production.

Domestic demand

Our forecast of domestic demand is driven by an intensity of use analysis of steel consumption based on Citi economic forecasts.

Steel intensity is plateauing on an IP basis

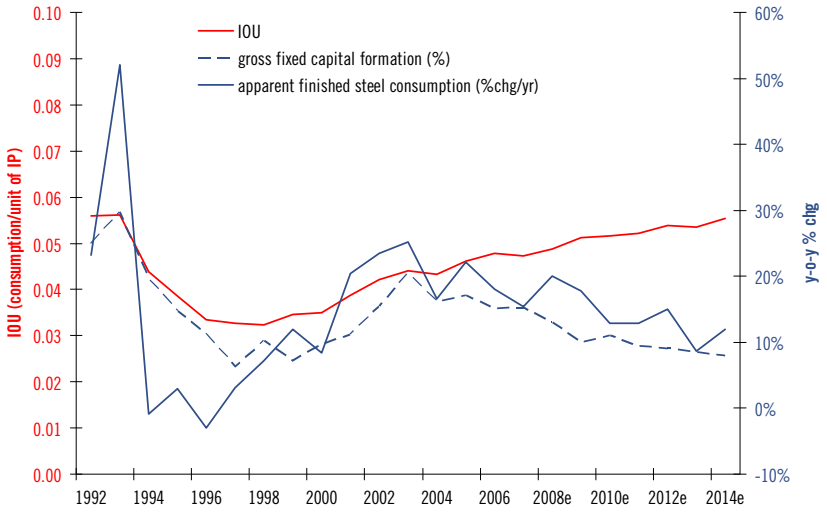
Figure 29. Chinese Steel Consumption Intensity based on IP



Source: World Steel Org, Citi Investment Research

But not on the basis of FCF

Figure 30. Chinese Steel Consumption Intensity based on Fixed capital formation



Source: World Steel Org, Citi Investment Research

Although IP intensity shows signs of plateauing, FCF intensity shows no such sign. Our steel consumption and production forecast is based on both data sets.

Crude steel production will reach 650mt by 2009

Figure 31. China Steel Market

	2006	2007	2008	2009	2010
Apparent Fi Consumption	442.5	510.4	612.8	721.8	814.7
Finished Imports	18.6	16.9	15.0	15.0	15.0
Exports	43.1	63.2	45.0	50.0	65.0
Finished Production	467.0	556.7	642.8	756.8	864.7
Crude Production	418.8	487.2	573.9	658.1	751.9

Source: World Steel Org, Citi Investment Research

And coal imports 1MT

Figure 32. China Coking Summary

China	2006	2007	2008	2009	2010
Crude Steel Prodn (mt)	418.8	487.2	573.9	658.1	751.9
Pig Iron Prodn	413.6	469.0	551.1	639.4	729.8
Coal Demand	446.7	506.5	595.2	690.5	788.2
CC/t Iron	1.08	1.08	1.08	1.08	1.08
Met Coal Import	4.7	6.2	10	15	16
Met Coal Exports	4.4	5	5	5	6
Net Exports	-0.3	-1.2	-5.0	-10.0	-10.0

Source: World Steel Org, Citi Investment Research

Risks from a US recession

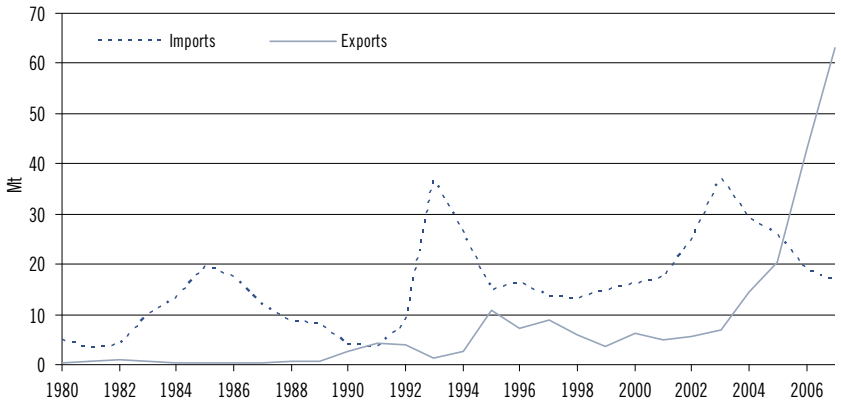
Chinese domestic Steel demand is not immune from a US recession but it is insulated. We have shaved our Chinese GDP forecasts to 10.8%. However, steel demand would be less sensitive, being centered on construction and infrastructure. Indeed, a policy shift to increase infrastructure spend would boost steel demand.

Exports

Crude steel exports increased dramatically in 2007 reaching more than 60Mt. Exports increased by 40Mt between 2005 and 2007, accounting for a third of the increase in crude steel consumption.

Steel exports have surged

Figure 33. Chinese Crude Steel Imports and Exports

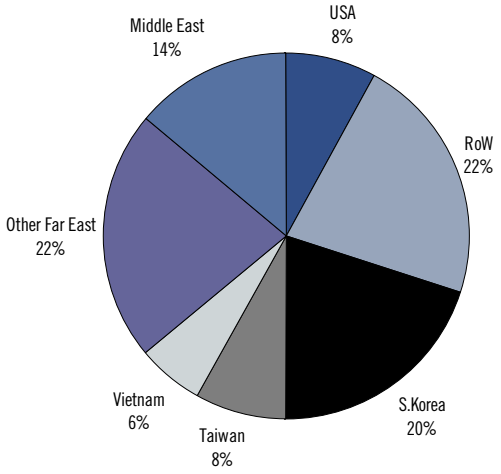


Source: General Administration of Custom – China, Citi Investment Research

Other Asian markets are the main destinations for Chinese steel exports. The US accounts for only 8%.

Mostly to the Middle east and Asia

Figure 34. Chinese steel exports by destination



Source: Tex Report, Citi Investment Research

The sustainability of these exports is an important risk (both positive and negative) for coal markets.

Chinese exports may be curtailed either because of government controls, or weak international demand and the implications are profoundly different.

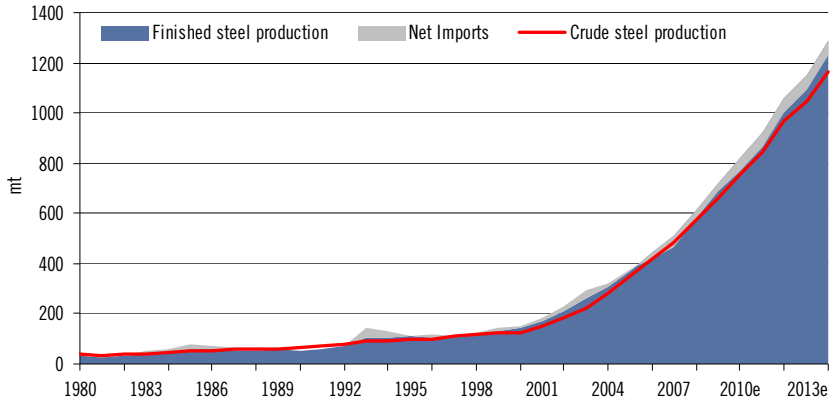
Beijing has being trying to curtail production from old inefficient and polluting blast furnaces but with mixed success. The most recent initiative (December 2007) calls for the curtailment of 49Mt of pig iron capacity by 2010, bringing the total to 89Mt.

Changes in export and import taxes also designed to curtail production for export have been progressively introduced over the last 18 months.

If Beijing succeeds in reducing production for export, supply will have to be met from elsewhere, most likely another Asian supplier. It is likely that the additional source will be more dependent than China on imported coal (and iron ore).

On the other hand if exports are curtailed because of weaker global demand this would be damaging to markets. This is the most likely source of exposure of steel making raw materials to a US induced recession.

Figure 35. Chinese Steel Production Forecast

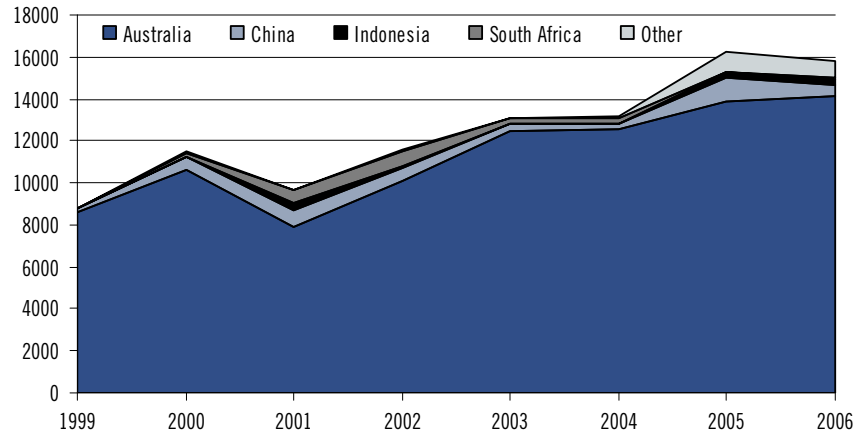


Source: World Steel Org, Tex Reports, Citi Investment Research

India

Indian coking imports are about to take off

Figure 36. India's Coking Coal Imports



Source: Tex Reports, Platts

Indian crude steel production is scheduled to increase by 100Mt to 160Mt by 2012 if all the announced projects were to proceed. This will not happen, but even so, demand for coking coal will be tremendous.

India has little or no hard coking coal reserves

But steel companies are pursuing a number of strategies to mitigate the impacts

India has little or no hard coking coal reserves, and steel companies are pursuing a number of strategies to mitigate the impacts on their business.

Tata Steel in particular has been successful in developing coking technologies which allow an increased proportion of semi-soft coals to be used in the blend. They have increased the proportion of domestic coal from 30% to 70%. Ash content is reduced from 32% to 14% and the coke produced has an ash content of 11%. Other companies are pursuing similar technology options.

Companies are also looking to acquire coal reserves overseas, Mozambique and Australia are important focuses.

Rest of Asia

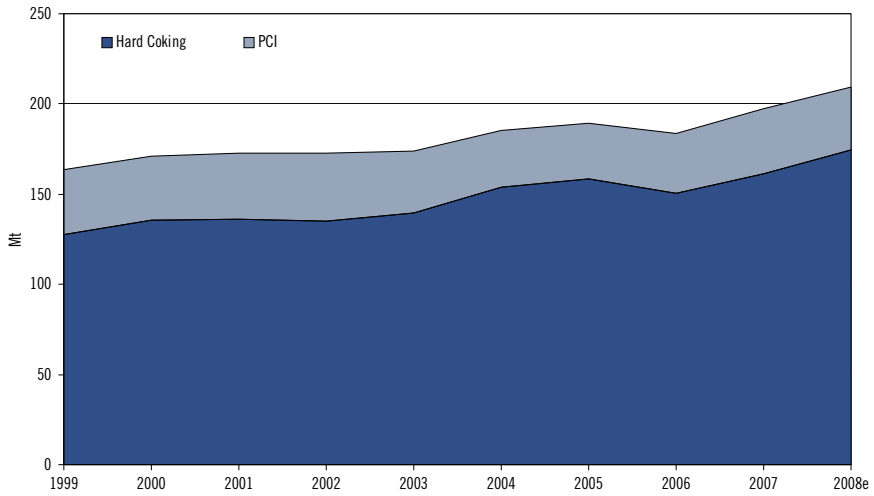
Japanese imports are also rising strongly. Japan is the largest importer of seaborne coking coals. Steel production is up 2.4% at 119Mtpy, and their demand for coal is being further boosted by a need to restock, after destocking in 2006.

Brazil

After China and India, Brazil is the largest source of new blast furnace capacity.10Mt is scheduled for construction.

Brazilian imports are increasing

Figure 37. Brazilian Metallurgical Coal Imports



Source: Tex report, Citi Investment Research

Europe

Europe's imports of coking coal have increased strongly in recent years as domestic production declined. However imports fell sharply in late 2007 in response to high prices and high freight rates.

Alternative steel making technologies

Coal quality issues - PCI, Semi-soft. Semi-hard

In earlier periods of extreme tightness in hard coking coal supply steel mills have responded by increasing consumption of cheaper semi-soft and PCI coals. However that may not be an option this time for both technical and economic reasons.

A number of producers are now operating at injection ratios close to technical maximum.

Figure 38. Pulverized coal injection, 2006

Country	kg/t hm	consumption (Mt)
Japan	115	9.8
Korea	180	4.9
Europe	165	11
Brazil	145	3.6
India	85	2.2
Average	120	

Source: Barlow Jonker

Increasing use of semi-soft coals in the coke blend reduces coke yield and hence steel output.

In addition the supply-demand outlook for these coal types is also tight and prices are set to move higher, perhaps narrowing the gap with hard coking.

A number of steel mills are perusing alternative technologies to mitigate their dependence on the hard coking coal market.

Innovative coke marking technologies such as stamping are being utilized by Indian mills in particular.

Other less advanced technologies which are alternatives to the traditional blast furnace production route use thermal coal or gas as the reductant. Of these the most developed is Finex, which is being implemented by Posco.

Supply demand outlook

The coking coal market is set to remain chronically tight because of supply shortages and strong demand from India and China. Additional supply might be available from Indonesia, Mozambique and Mongolia, but only at high costs and with protracted delays.

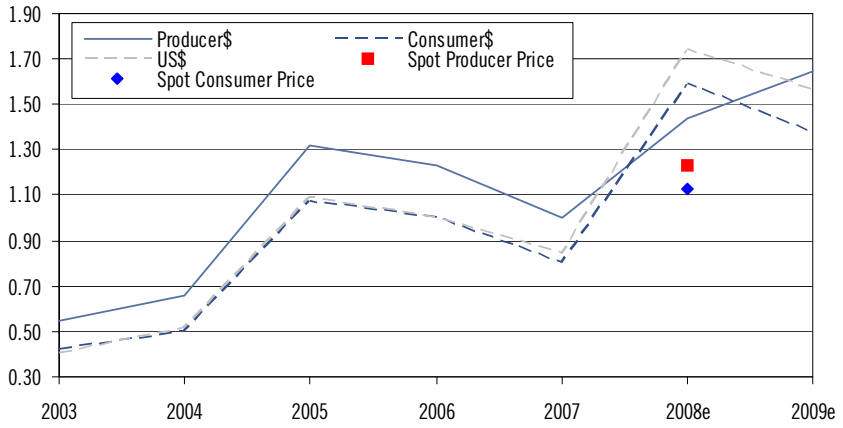
Exchange Rate influences

In 2007/08 USD contract prices declined by 15.6%. AUD prices fell 23% and the weighted average price received by producers fell 19%.

In 2008/09 contract price negotiations producers will be determined to ensure that USD prices agreed compensate for these disparities and insulate against further USD weakness.

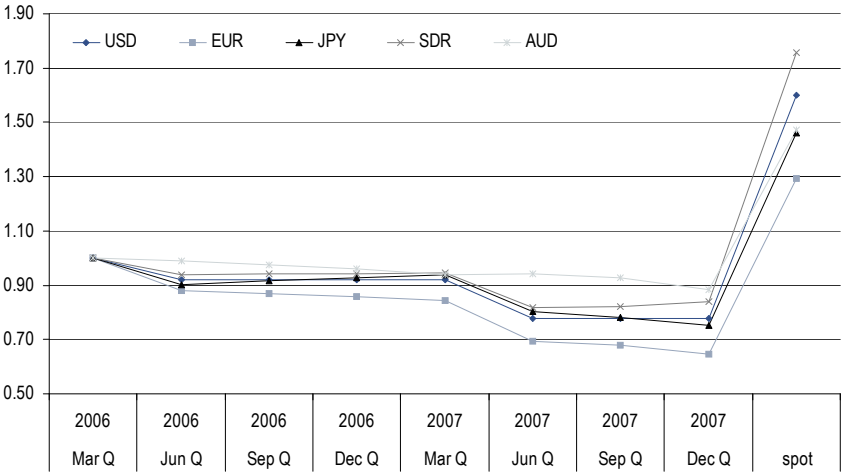
Producers price have lagged USD prices

Figure 39. Coking Coal "Producer" and "Consumer" Prices



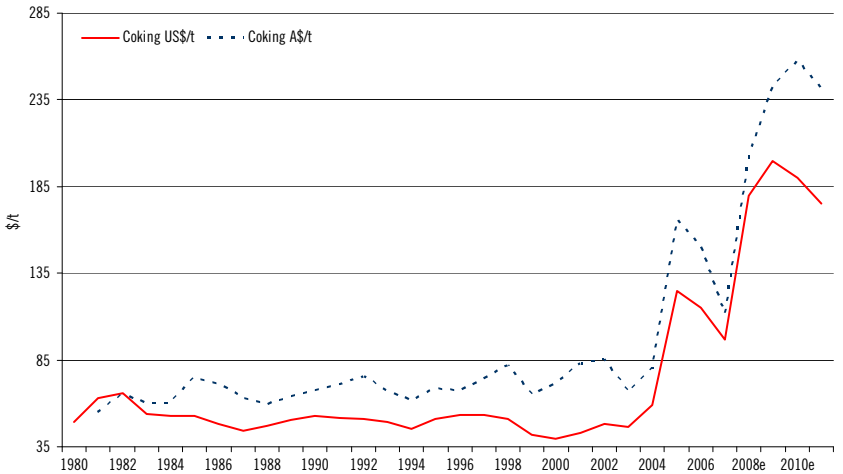
Source: Bloomberg, Global Coal, Citi Investment Research

Figure 40. Coking Coal Consumer Prices



Source: Bloomberg, Global Coal, Citi Investment Research

Figure 41. Coking Coal Price in USD and AUD



Source: Bloomberg, Global Coal, Citi Investment Research

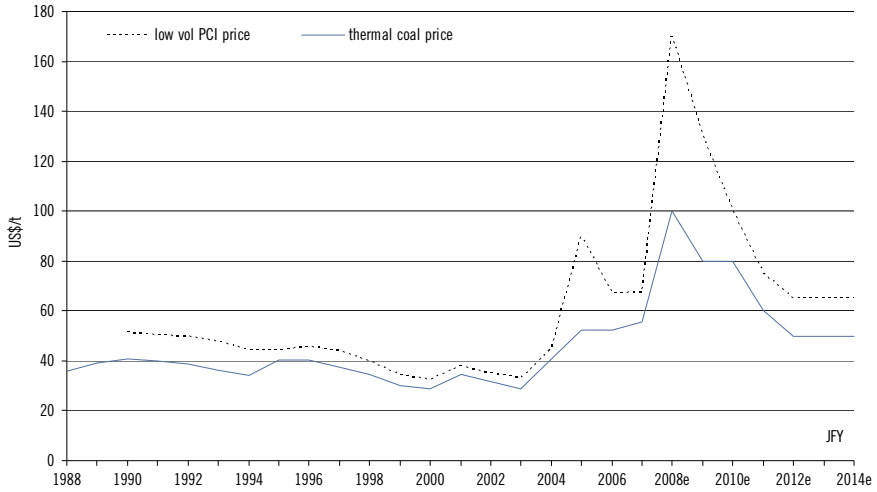
PCI Coals – Even tighter than Hard Coking

PCI markets are particularly tight due to:

- Increasing injection ratios at Asian mills, especially Korea;
- Australian exports constrained by port and rail bottlenecks; and
- Production problems at major producers in Australia and Canada.

The semi soft premium will be USD7/t on a sustained basis

Figure 42. PCI & Thermal Coal Prices (JFY)



Source: Global Coal, Tex Reports, Citi Investment Research

We expect a large increase in PCI prices in the current round of negotiations partly a catch-up from last years subdued increase and partly a reflection of current market tightness.

Further forward, demand for PCI coals may be capped by: the reduced economic incentive, if the price gap between PCI and coking coals narrows; and technical constraints as PCI ratios reach technical maximum.

In our longer term price forecasts we have assumed that the premium of PCI over thermal coal reverts to US$15/t (US$8/t over semi soft). This takes account of washing losses and calorific value adjustments.

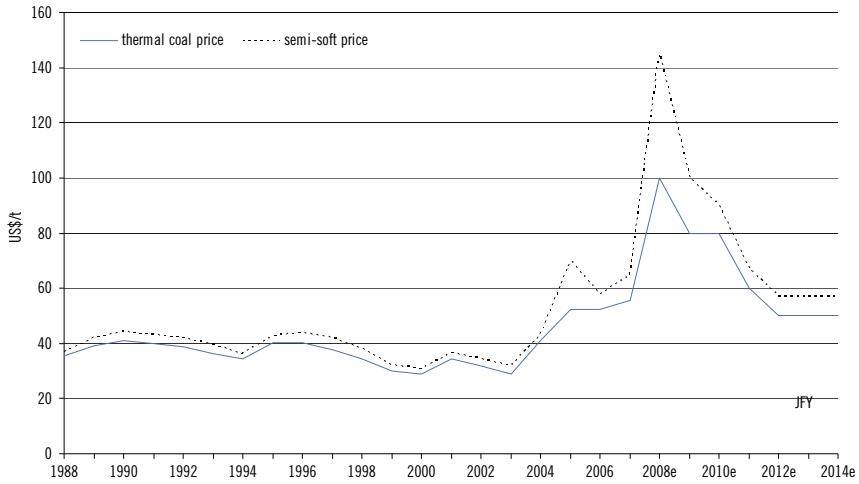
Semi-Soft Coal - A Balancing Act

Semi-soft prices will move sharply higher in the current round of pricing. Further out we expect the premium of semi-soft over thermal coal to revert to US$7/t.

Demand for semi-soft coals will be constrained by the loss of coke yield as the proportion of semi-soft in the charge is increased. However adoption of alternative coke making technologies such as stamping could boost semi-soft demand.

The PCI thermal coal premium will expand in 2008 but return to USD15/t

Figure 43. Semi-Soft and Thermal Coal Prices



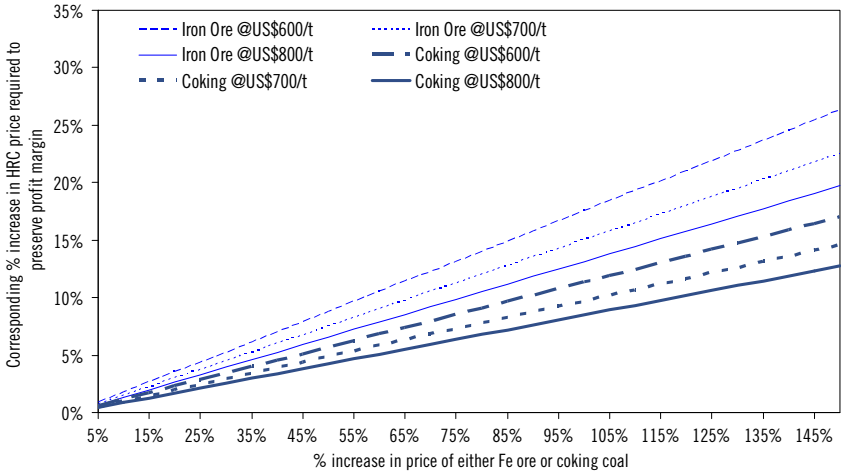
Source: Tex Reports, Citi Investment Research

Implications for steel markets

The impacts on steel markets of higher coking coal prices can be gauged from Figure 50.

If the price of coking coal doubles and iron ore prices increase by 60% as we expect, steel prices will have to increase by about 16% if margins are to be maintained.

Figure 44. HRC Price increase to maintain margins at various coal and iron ore prices.



Source: Citi Investment Research

Structural Change and Long Term Prices

Here we review some of the structural changes in the markets which are expected to influence long term pricing. We also quantify our long term price assumptions.

Thermal Coal

Structural characteristics of the thermal coal market do not support a radical transformation in the industry. But in the medium term barriers to entry will be supportive.

Barriers to entry – infrastructure bottlenecks

Barriers to entry in the thermal coal market are generally low. However, at present (and we believe for a number of years to come) a lack of port and rail infrastructure is restricting supply and the entry of new players. These bottlenecks are most evident in Australia but are also present in South Africa, Canada, Russia and China. Of the major suppliers, only Indonesia is not affected.

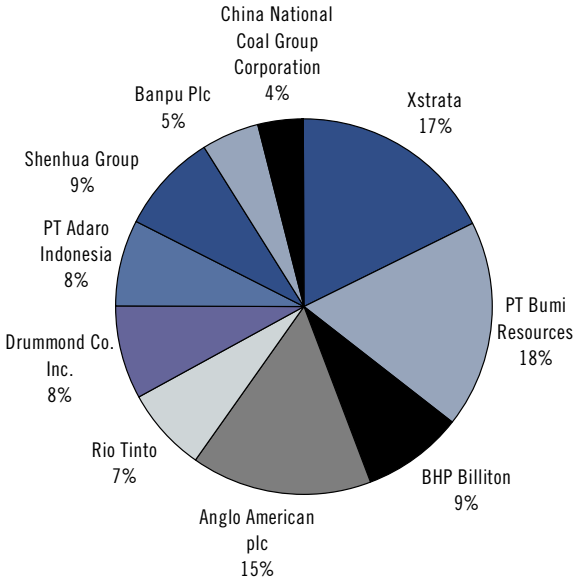
Thus port and rail bottlenecks will be a barrier to entry for many participants for some years to come. But for those producers unconstrained there are opportunities to expand and take market share.

Consolidation of ownership

The thermal coal industry is relatively unconsolidated and there has been no clear trend towards increased consolidation.

An unconsolidated market

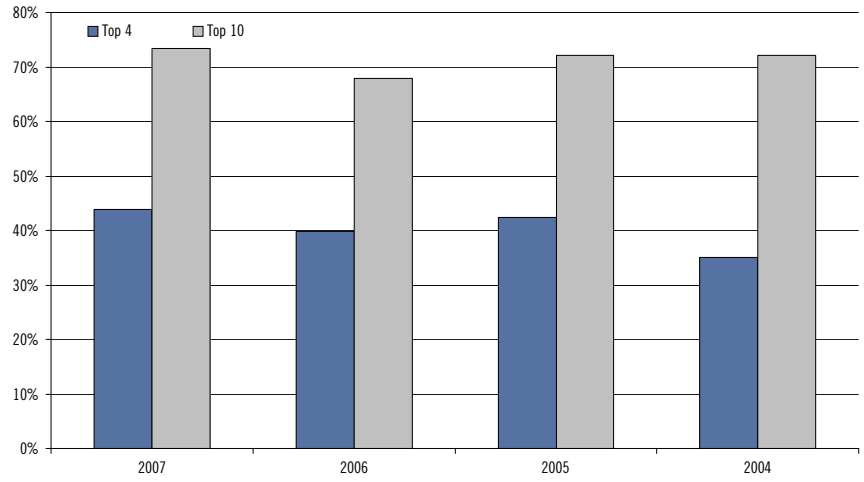
Figure 45. Market shares in Thermal coal



Source: Company Reports, Citi Investment Research

With no clear trend to consolidation

Figure 46. Consolidation in the thermal coal industry



Source: Company Reports, Citi Investment Research

Long term growth trends

The long term growth trend on thermal coal demand is considerably higher than many other commodities

In more mature Asian economies like Korea and Japan trend growth is 6-7%/yr, in line with or above trend economic growth. In China demand growth is 1.5 times above GDP.

Competitive position – energy and distance

The relative cost competitiveness of producers varies depending on the energy content of the coal and freight costs.

Figure 47. Competitive position by cash cost, energy adjusted and delivered prices

	FOB	FOB	CIF	CIF
	USD/t	USD/GJ	Asia	Europe
Australia	33	1.35	42	51
S Africia	32	1.2	48	47
Indonesia	30	1.3	38	47

Source: Citi Investment Research

- Adjusting for energy content flattens the curve, but after allowing for freight differentials the curve is much steeper.
- The ranking of countries also changes. Australian producers higher FOB costs are mitigated by higher energy content. South African producers are penalized when selling into Asia, but benefit relative to Australia into Europe.

Transition from contract to spot pricing – no clear evidence of margin compression

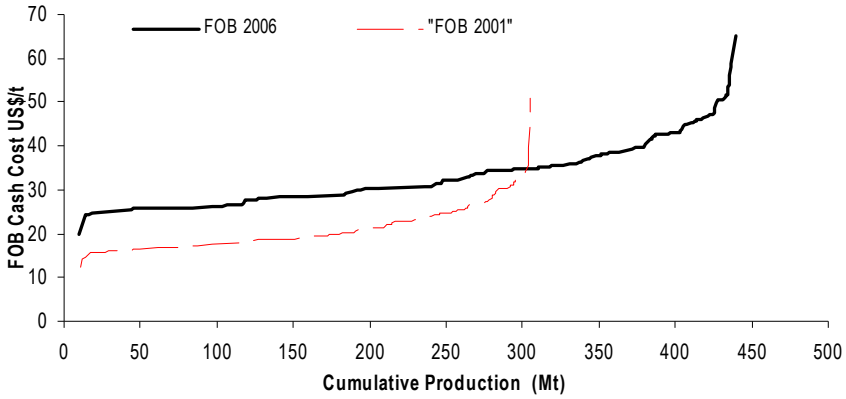
In the 1990's the Asian thermal coal market began to move from a pricing structure based on annual contracts to a more fragmented structure using spot and tender prices. Globalcoal.com began trading in mid 2002.

Although this has contributed to greater volatility in pricing there is no empirical evidence of margin compression. In fact spot prices have averaged some 2% above contract prices over the last five years.

Cost curve – flat and not steepening

The cost curve is flat

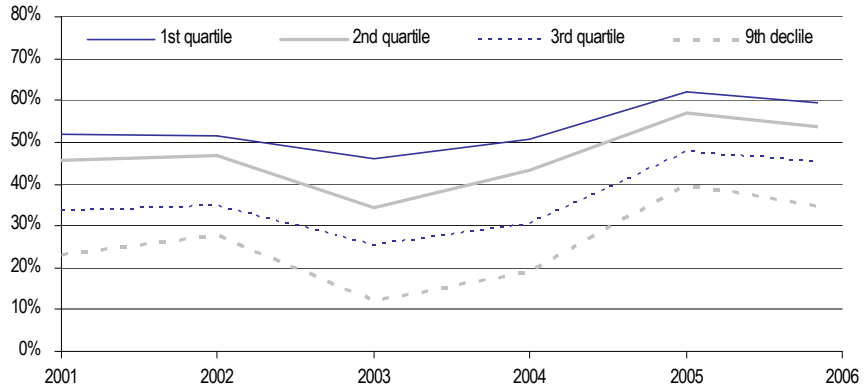
Figure 48. 2001 & 2006 Thermal Coal Cost Curve - By Mine FOB



Source: Company Reports, Citi Investment Research

Margins have been generally flat

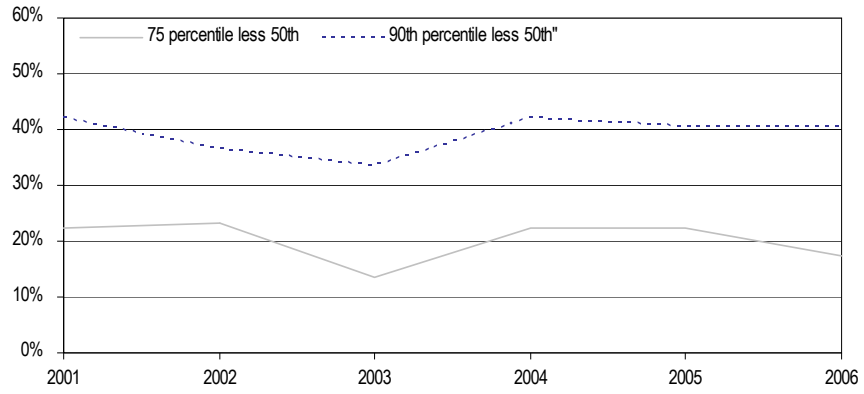
Figure 49. Thermal Coal Margins



Source: Citi Investment Research

The cost curve is not steepening

Figure 50. Cost curve - stable



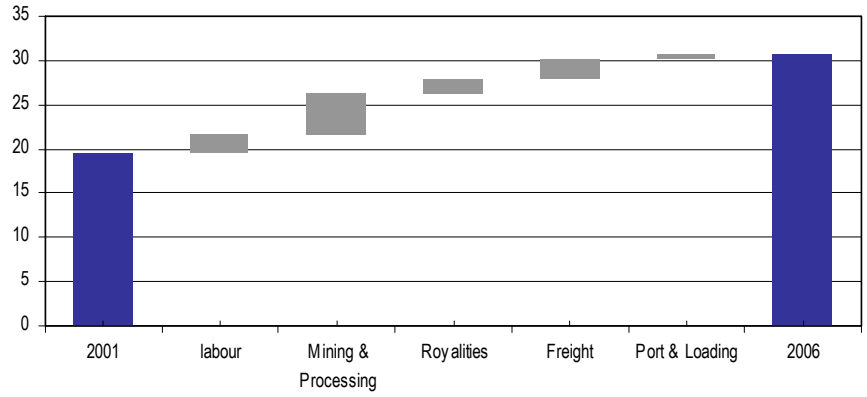
Source: Citi Investment Research

Drivers of operating cost inflation

Since 2001 industry average cash cost have increased by 57%. Mining and processing costs have been the largest source of inflation.

Cost increase 57% between 2001 and 2006 mining and processing cost were the largest contributor

Figure 51. Thermal FOB Cash Cost Change 2001-2006

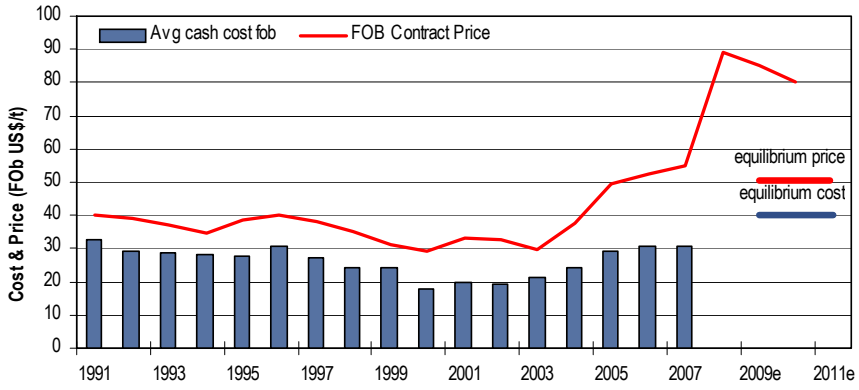


Source: Platts, Company Reports, Citi Investment Research

Margins

Margins have expanded dramatically recently but the long term trend is around 30%

Figure 52. Thermal Coal Cost and Price



Source: Global Coal, Citi Investment Research

Long Term Price

Figure 53. The long term thermal coal price

	2001	2007	Sustainable Component	LongTerm
Average Cash Cost	19	32	23	40
Margin				30%
Price				52

Source: Citi Investment Research

Metallurgical Coals

In contrast to thermal coal, structural characters of the coking coal market are supportive of higher long term prices. Most important are the high barriers to entry – high quality coking coal is a rare geological commodity. The industry is highly consolidated. Substitution pressures, although present are not a major threat.

Barriers to entry – reserves

High Quality coking coal is a rare geological commodity and global reserves are concentrated in specific regions, notably the Bowen Basin in Queensland Australia, the Appalachians of the eastern USA, and North Eastern British Columbia, Canada. Other regions with known reserves include Mongolia, Kalimantan and Mozambique. These are discussed earlier.

Most coking coal is produced from underground mines, and the longer lead times for development and higher capital cost add to the barriers to entry.

Quality issues – high quality hard coking coal is rare

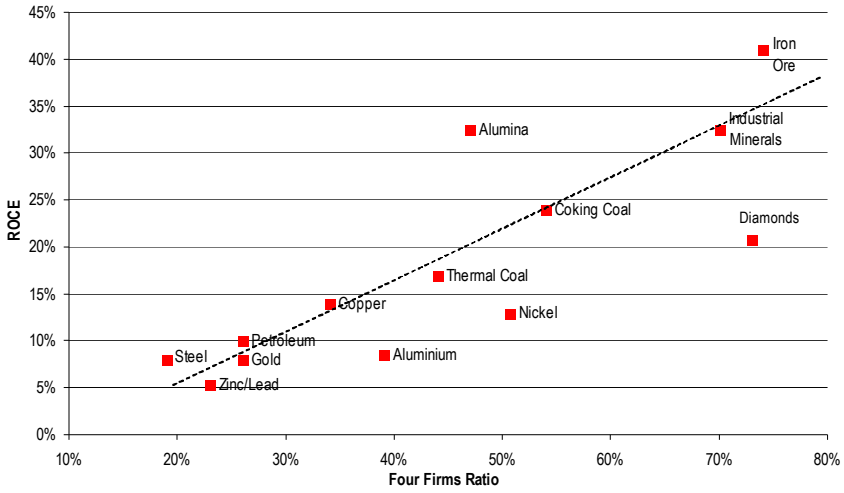
High quality hard coking coal is a rare geological commodity. There are plenty of reserves of semi-hard and semi-soft coals. However the use of these coals necessitates the inclusion in the coking blend a proportion of premium quality hard coking coal.

Consolidation – Coking Coal is highly consolidated

The coking coal is a consolidated industry relative to other commodity businesses. The degree of consolidation reflects the high barriers to entry.

Coking coal is a consolidated business

Figure 54. Coking Coal –a consolidated business

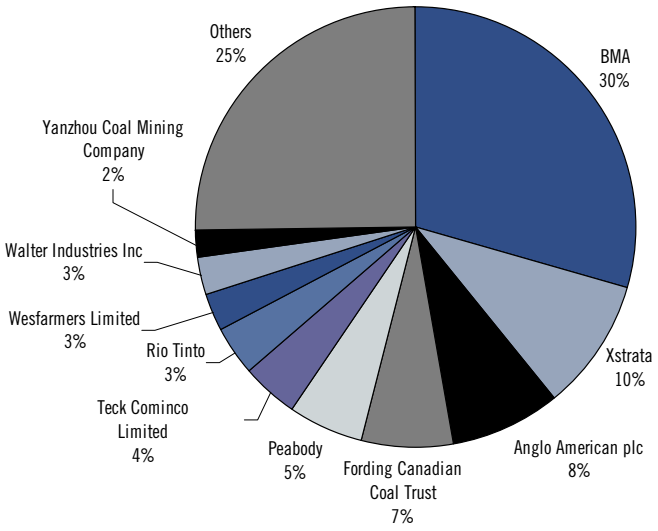


Source: Company Reports, Citi Investment Research

Recent merger and acquisition activity has resulted in a marked increase in concentration of ownership. Five companies now account for 65% of production.

Five companies account for 65% of production

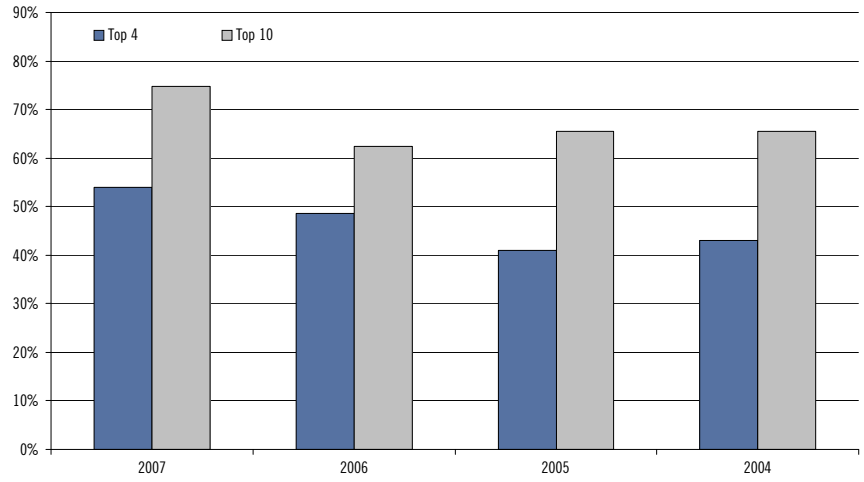
Figure 55. Market Shares in Coking Coal



Source: Company Reports, Citi Investment Research

And M&A are resulting in further consolidation

Figure 56. Increasing consolidation in coking coal



Source: Company Reports, Citi Investment Research

Competitive position – freight is a leveler

Figure 57. Coking Coal costs on and FOB and CIF Basis

	FOB USD/t	CIF Europe
USA	63	100
Australia	41	100

Source: Citi Investment Research

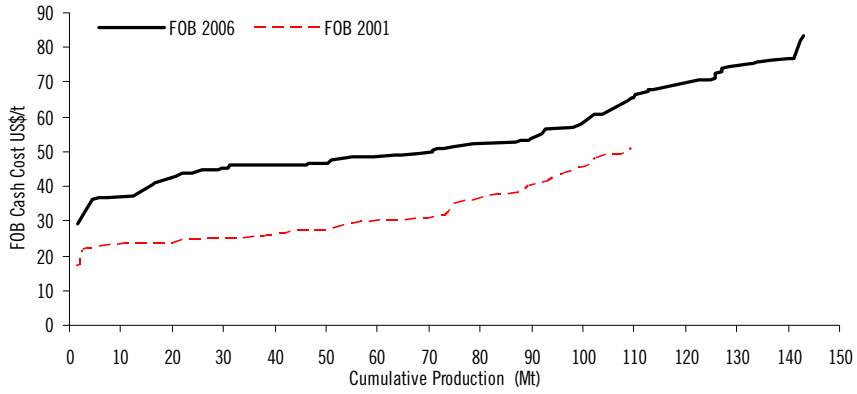
The delivered cost of coking coal into the European market from Australia and the USA is on a par, despite the USA producers being 50% more expensive on and FOB basis.

Coking Coal Long Term Price

Production costs

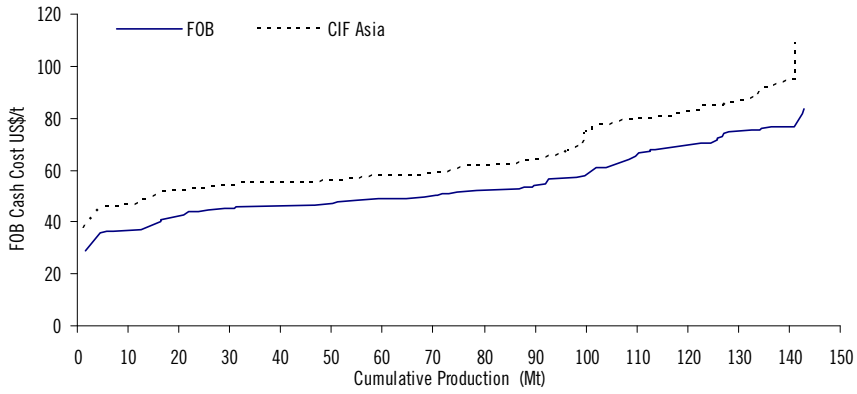
The coking coal cost curve is steeper than thermal coal

Figure 58. 2001 & 2006 Coking Coal Cost Curve - By Mine FOB



Source: Company Reports, Citi Investment Research

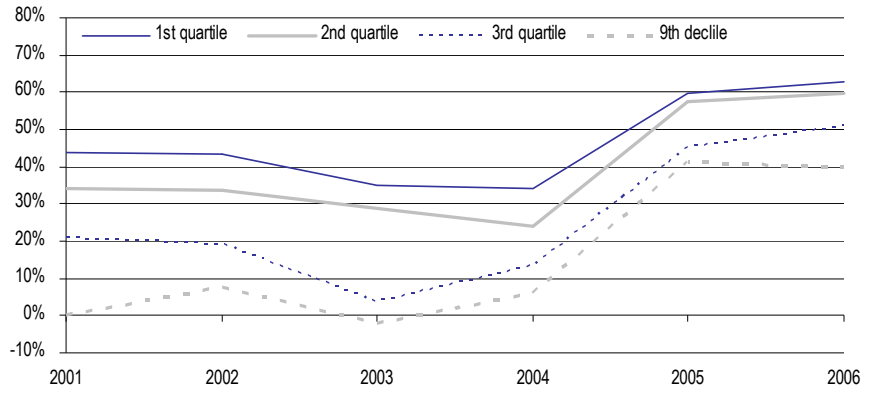
Figure 59. 2006 Coking Coal Cost Curve - By Mine FOB & CIF



Source: Citi Investment Research

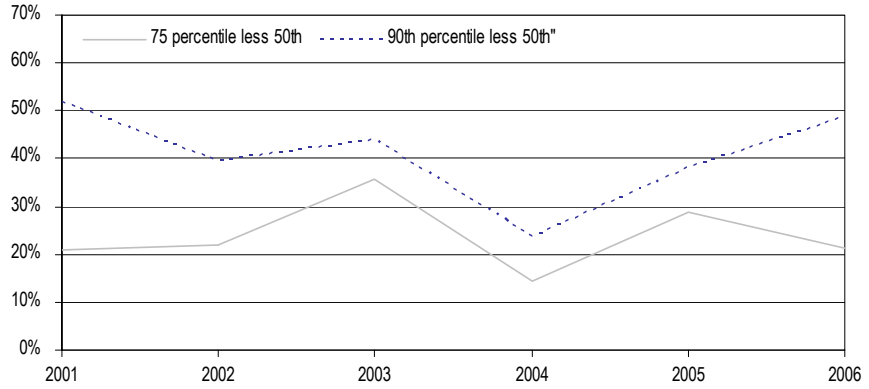
But is not changing shape

Figure 60. Coking Coal FOB Margins



Source: Citi Investment Research

Figure 61. Coking Coal Margin Differential



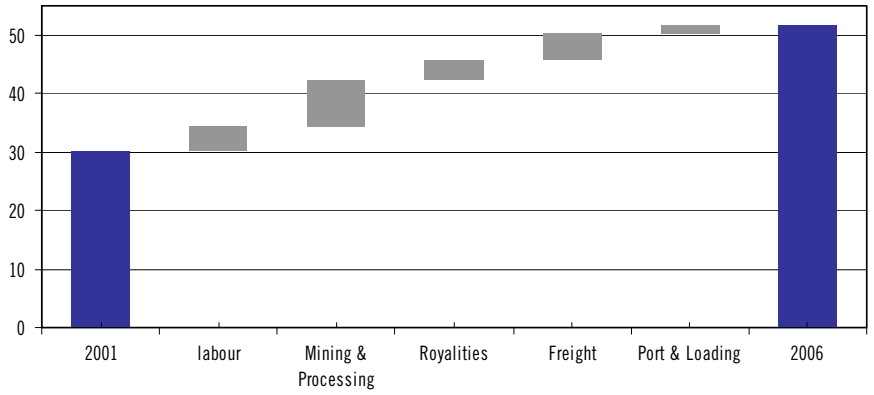
Source: Citi Investment Research

Drivers of operating cost inflation

Between 2001 and 2006 industry average cash costs increased by 72% to US$51/t. The main contributors to the cost inflation were mining and processing and freight (mine to port).

Cost increased 72% in 4 years

Figure 62. Coking FOB Cash Cost Change 2001-2006 (US$/t)

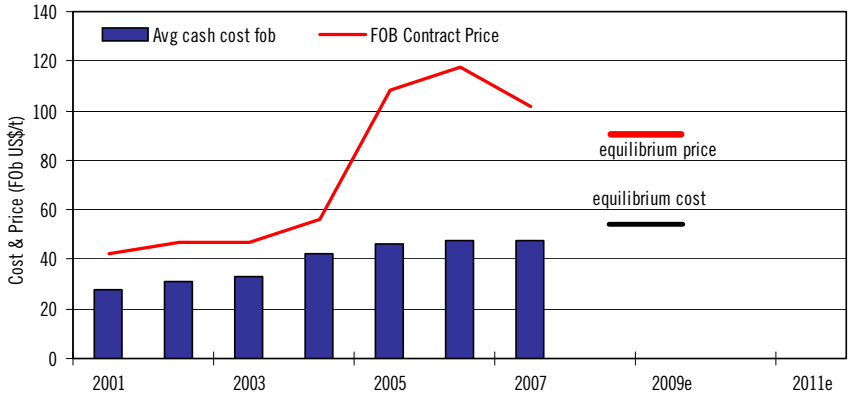


Source: Platts, Company Reports, Citi Investment Research

Margins

Margins have expanded but the trend is 40%

Figure 63. Coking Coal Industry Average Cost and Price (FOB US$/t)



Source: Citi Investment Research

Long Term Price

We have derived the long term coking coal price by two methods. Both rely on our usual approach, based on the relationship between cash production costs and prices, but one looks at average industry costs, the other looks at costs of the marginal supplier - Canada.

Industry average costs and margins

Industry average costs increased from US$30 to US$52/t between 2001 and 2006 (14%/yr). We estimate the sustainable cost component in 2006 to be US$40/t, a trend increase of 8%/yr. Other cost components are cyclical.

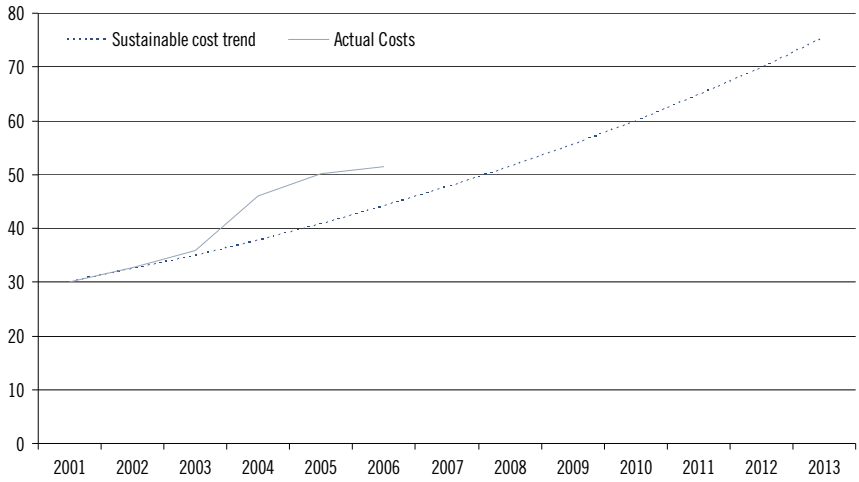
Projecting the sustainable cost trend gives a sustainable cost of US$86/t in our "LT year" of 2015.

We assume a long term average historic margin of 40%.

This implies a long term price of 2007 US$120/t.

Cost are expected to increase 8% on trend basis

Figure 64. Trends in actual costs and sustainable cost inflation (US$/t)



Source: Citi Investment Research

Long term cost of $86/t and trend margins of 40% gives long term price of $US120/t

Figure 65. Coking Coal Long Term Cost and Prices (US$/t)

	2001	2006	Sustainable Component	LongTerm
Average Cash Cost	30	51.5	45	86
Margin				40%
Price				120

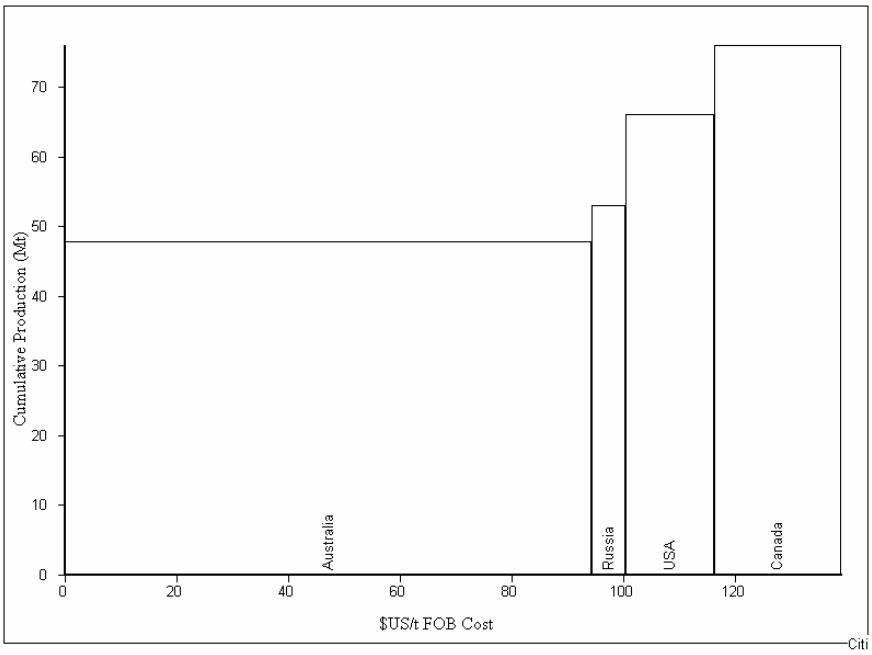
Source: Citi Investment Research

Canada – the marginal supplier

The economics of Canadian production is important in the structure of the coal industry because:

Cost at the marginal supplier - Canada are US$80/t

Figure 66. Coking Coal FOB Country Cost Curve ($US/t)



Source: Platts, Tex Reports, Citi Investment Research

- The coking coal cost curve is steeper than thermal coal – increasing the importance of the economic of producers at the upper end of the cost curve in price determination.
- The top of the coking coal cost curve is dominated by Fording, who are a 13Mtpy producer and clearly not a swing source of supply. Thus the long term pricing outlook will be influenced by the economics of Canadian operations.

Cash costs in Canada in 2006 were around US$80/t, applying a margin of 15% implies a stay in business price of US$90/t in 2006.

Continued strength in the Canadian dollar will push cost higher a long-term prices of USD120/t implies cost inflation of only 4%/yr.

THERMAL COAL SUMMARY

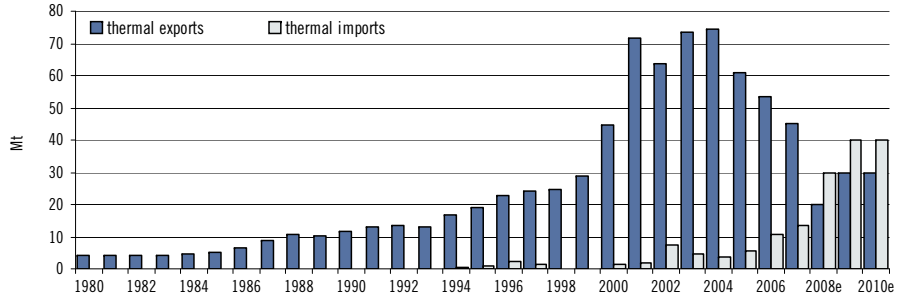
Last updated: 04-Feb-08

THERMAL COAL Supply Demand Balance

Mt	2004	2005	2006	2007	2008e	2009e	2010e	2011e	2012e	2013e	2014e
Imports											
Japan	94.5	96.2	91.7	100.7	97.4	98.8	99.3	99.5	99.8	100.0	100.3
S.Korea	56.2	56.1	59.0	65.6	62.1	58.9	66.3	73.4	72.0	70.6	69.3
Hong Kong	10.6	10.8	11.4	11.9	11.9	11.9	11.9	5.9	0.0	0.0	0.0
Taiwan	52.1	55.1	57.1	60.0	60.9	60.9	60.9	60.9	60.9	60.9	60.9
India	7.0	14.5	23.2	29.0	35.0	41.0	47.0	53.0	60.0	62.0	65.0
USA	22.7	17.9	20.2	18.9	20.0	20.0	20.0	20.0	20.0	20.0	20.0
EC	100.4	100.0	109.1	83.7	80.0	80.0	80.0	80.0	80.0	80.0	80.0
Others	50.0	65.0	70.0	75.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0
Total	**393.4**	**415.5**	**441.7**	**444.8**	**437.3**	**441.6**	**455.4**	**462.8**	**462.7**	**463.6**	**465.5**
Exports											
Australia	106.9	98.6	113.9	111.3	100.0	110.0	120.0	140.0	147.0	155.0	160.0
South Africa	66.6	72.9	65.6	65.0	65.0	80.0	80.0	80.0	80.0	80.0	80.0
Indonesia	92.7	129.0	174.4	164.9	179.0	185.0	185.0	185.0	185.0	185.0	185.0
US	5.6	5.2	5.4	9.4	5.0	5.0	5.0	5.0	5.0	5.0	5.0
China	70.7	55.5	43.2	32.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0
Columbia	50.3	53.7	58.0	60.0	62.0	65.0	70.0	70.0	70.0	70.0	70.0
Canada	1.9	1.4	2.8	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total	**394.7**	**416.4**	**463.3**	**446.6**	**404.0**	**438.0**	**453.0**	**473.0**	**480.0**	**488.0**	**493.0**
Balance	**1.3**	**0.9**	**21.6**	**1.8**	**-33.3**	**-3.6**	**-2.4**	**10.2**	**17.3**	**24.4**	**27.5**

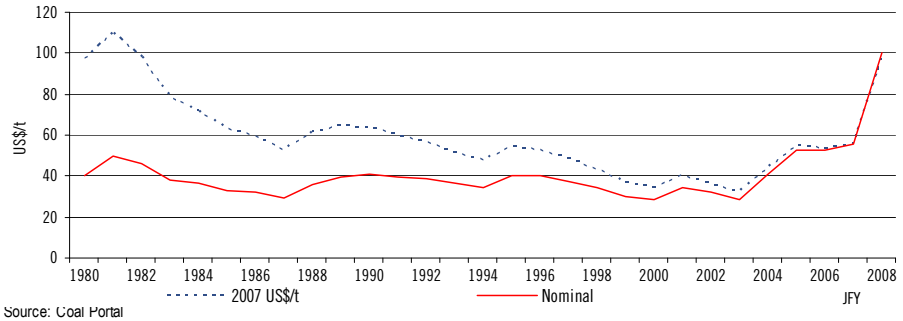
Source: Citi Investment Research

China's Thermal Coal Exports & Imports



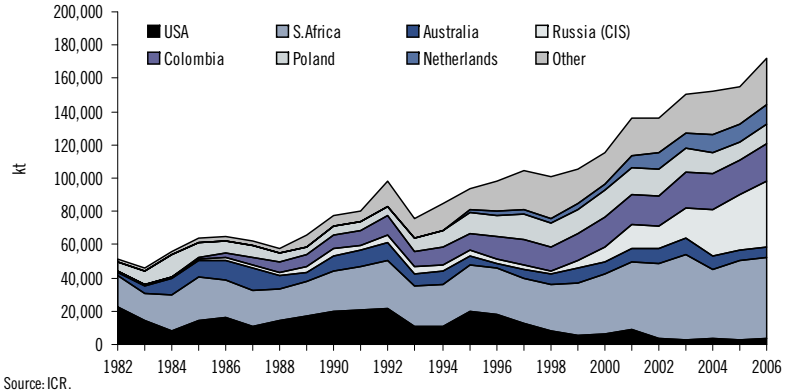
Source: Tex Report

Australia's Thermal Coal Contract Price



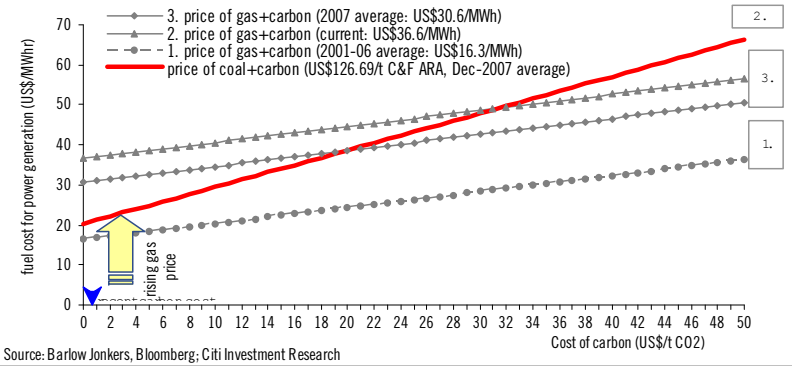
Source: Coal Portal

European Thermal Coal Imports



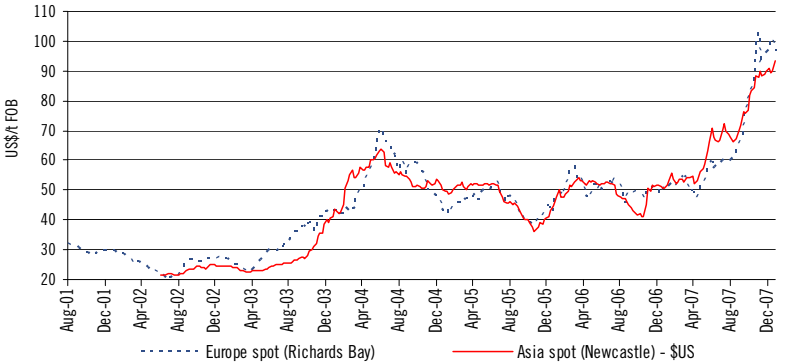
Source: ICR.

Europe's Gas & Coal Prices compared, including the cost of carbon



Source: Barlow Jonkers, Bloomberg; Citi Investment Research

Thermal Coal Spot Prices



Source: Global Coal

METALLURGICAL COAL SUMMARY

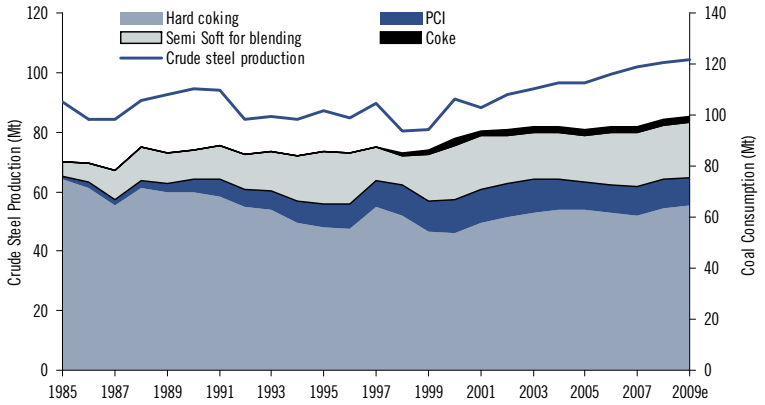
Last updated: 04-Feb-08

METALLURGICAL COAL Supply Demand Balance

Mt	2004	2005	2006	2007	2008e	2009e	2010e	2011e	2012e	2013e	2014e
Imports											
Japan	79.7	78.7	79.7	79.9	82.3	83.1	83.9	84.8	85.6	86.5	87.4
South Korea	18.2	18.3	18.3	19.0	20.2	20.4	20.6	20.8	21.0	21.2	21.4
Taiwan	8.7	8.2	8.4	8.5	8.6	8.7	8.8	8.8	8.9	9.0	9.1
India	13.2	16.8	16.6	20.0	25.0	27.5	30.2	33.2	36.6	40.2	44.3
EC	42.2	44.6	42.4	44.6	45.1	45.0	45.8	46.0	46.1	46.7	47.2
China	6.8	7.2	4.7	6.2	7.0	10.0	16.0	11.0	18.0	12.0	11.0
Brazil	16.4	15.8	13.6	18.9	18.3	19.6	20.4	21.2	22.0	22.8	23.5
Total	**185.1**	**189.5**	**183.5**	**197.1**	**209.4**	**219.3**	**225.7**	**231.8**	**238.2**	**245.4**	**252.8**
Exports											
Australia	117.1	126.3	123.9	137.0	135.0	140.0	140.0	150.0	153.0	155.0	155.0
US	21.1	21.7	20.9	25.8	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Canada	22.1	25.1	23.2	24.2	27.0	27.0	27.0	27.0	27.0	27.0	27.0
China	5.7	5.3	4.4	2.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0
other	7.4	13.8	12.5	12.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total	**173.4**	**192.2**	**184.9**	**189.6**	**199.0**	**204.0**	**204.0**	**214.0**	**217.0**	**219.0**	**219.0**
Balance	**-11.7**	**2.6**	**1.3**	**-7.6**	**-10.4**	**-15.3**	**-21.7**	**-17.8**	**-21.2**	**-26.4**	**-33.8**

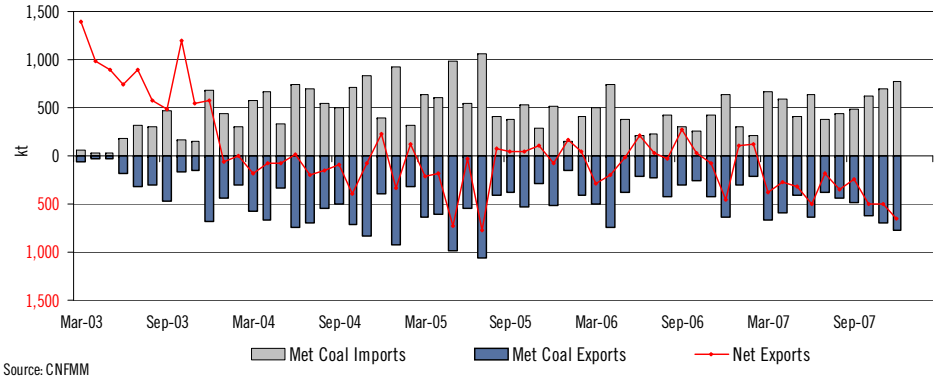
Source: Tex Report; Citi Investment Research

Japanese Metallurgical Coal Imports and Crude Steel Production



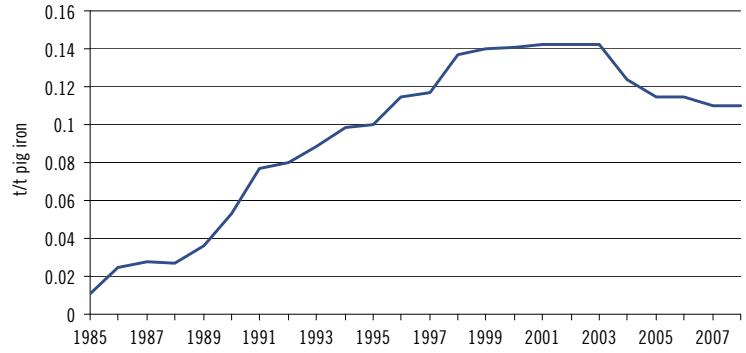
Source: Tex Report, IISI; Citi Investment Research

China's Monthly Metallurgical Coal Trade



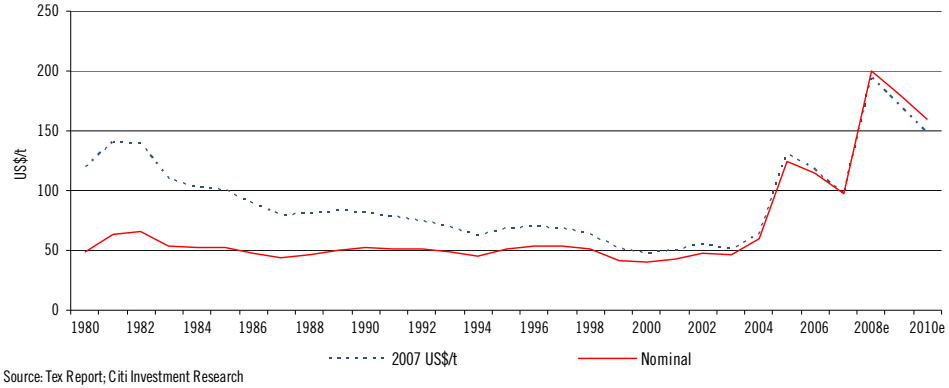
Source: CNFMM

PCI Ratio Japan



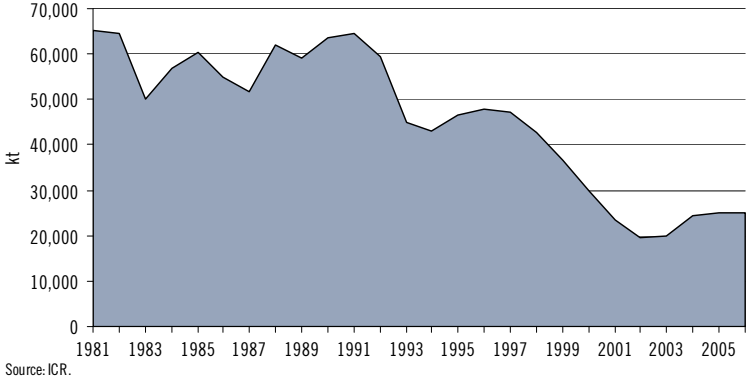
Source: Tex Report; Citi Investment Research

Australian Coking Coal Contract Price - JFY



Source: Tex Report; Citi Investment Research

USA Coking Coal Exports



Source: ICR.

Figure 67. Commodity price forecasts – Half Yearly

HALF YEARLY		Spot	Dec-06 act	Jun-07 act	Dec-07 act	Jun-08 est	Dec-08 est	Jun-09 est	Dec-09 est	Jun-10 est	Dec-10 est	Long term
AVERAGE EXCHANGE RATES												
A$/US$		0.90	0.76	0.80	0.87	0.83	0.84	0.82	0.82	0.80	0.80	**0.75**
EURO/US$		1.49	1.28	1.33	1.41	1.54	1.47	1.44	1.44	1.47	1.47	**1.10**
US$/ZAR		7.31	7.22	7.17	7.02	7.50	7.50	8.10	8.10	8.35	8.35	**9.50**
PRECIOUS METALS & DIAMONDS												
Gold	US$/oz	934	618	659	730	900	900	950	950	1,000	1,000	**700**
Silver	US$/oz	16.7	12.2	13.5	13.4	15.0	15.0	15.5	15.5	16.0	16.0	**12.00**
Platinum	US$/oz	1690	1,173	1,239	1,397	1,270	1,270	1,150	1,150	1,050	1,000	**1,000**
Palladium	US$/oz		322	358	445	370	370	300	300	300	300	**300**
BASE METALS												
Aluminium	US¢/lb	119	118	127	113	120	120	120	120	90	90	**80**
Alumina: LT contract/Aust export	US$/t		346	368	345	379	379	385	385	286	286	**220**
Copper	US¢/lb	325	334	307	340	315	300	350	350	300	300	**145**
Molybdenum	US$/lb		25.91	28.39	32.35	34.00	30.00	20.00	20.00	10.00	10.00	**8.00**
Nickel	US$/lb	12.45	14.13	20.27	13.45	10.50	10.00	8.00	8.00	6.00	6.00	**6.00**
Cobalt	US$/lb		20.31	26.88	30.80	45.00	25.00	13.70	13.70	10.30	10.30	**8.00**
Zinc	US¢/lb	105	171	163	134	104	105	100	100	100	100	**60**
Lead	US¢/lb	124	64	87	143	115	110	110	110	90	90	**30**
Uranium	US$/lb		54.0	100.1	97.2	95.0	130.0	110.0	110.0	80.0	80.0	**25.00**
INDUSTRIAL MINERALS												
Mineral Sands												
Rutile	US$/t		478	485	482	500	530	530	530	530	530	**500**
Zircon	US$/t		790	785	786	765	750	700	700	650	650	**550**
Ilmenite	US$/t		80	84	84	93	100	105	105	105	105	**95**
Synrutile	US$/t		405	413	420	420	440	440	440	440	440	**470**
RBM Chloride Slag	US$/t		404	408	415	410	410	440	440	450	450	**400**
TiO2 Pigment	US$/t		1,885	1,894	1,916	2,000	2,000	2,100	2,100	2,100	2,100	**1,900**
Borates												
Boric Acid (56% B2O3)	US$/t		853	821	760	800	800	800	800	800	800	
Fertilisers												
DAP	US$/t		250	250	365	390	390	370	370	350	350	**300**
COAL												
Contract prices												
Asia												
Hard coking benchmark	US$/t		115.00	106.00	97.00	148.50	200.00	190.00	180.00	170.00	160.00	**120.00**
Semi soft benchmark	US$/t		58.00	61.38	64.75	104.88	145.00	122.50	100.00	95.00	90.00	**57.00**
Thermal benchmark	US$/t		52.50	54.08	55.65	77.83	100.00	90.00	80.00	80.00	80.00	**50.00**
Hard coking change (US$/t JFY inc)			-10.00		-18.00		+103.00		-20.00		-20.00	
Semi soft change (US$/t JFY inc)			-12.00		+6.75		+80.25		-45.00		-10.00	
Thermal change (US$/t JFY inc)			nil		+3.15		+44.35		-20.00		nil	
LV-PCI	US$/t		67.00	67.33	67.65	118.83	170.00	150.00	130.00	115.00	100.00	
Europe												
Hard coking benchmark	US$/t		115.00	106.00	97.00	148.50	200.00	190.00	180.00	170.00	160.00	**120.00**
Semi soft benchmark	US$/t		60.20	63.58	66.95	107.08	147.20	124.70	102.20	97.20	92.20	**57.00**
Spot prices												
Thermal Asia	US$/t	90.15	48.15	54.63	75.20	100.00	100.00	90.00	80.00	80.00	80.00	**50.00**
Thermal Europe	US$/t	95.27	50.28	51.87	73.05	100.00	100.00	90.00	80.00	80.00	80.00	**54.00**
IRON ORE												
Asia												
Lump (Brockman)	US¢/DLTu		95.27	99.79	104.32	135.61	166.91	166.91	166.91	141.87	116.84	**50.00**
Fines (Brockman)	US¢/DLTu		74.63	78.18	81.72	106.24	130.76	130.76	130.76	111.14	91.53	**40.00**
Yandi fines	US¢/DLTu		70.15	73.48	76.81	99.85	122.89	122.89	122.89	104.46	86.03	**37.60**
Lump (Brockman) (% change JFY)			+19%		+9.5%		+60%		nil		-30%	
Fines (Brockman) (% change JFY)			+19%		+9.5%		+60%		nil		-30%	
Yandi Fines (% change JFY)			+19%		+9.5%		+60%		nil		-30%	
Europe												
Lump (Brockman)	US¢/DMTu		117.77	128.96	128.96	206.33	206.33	206.33	206.33	144.43	144.43	**56.00**
Fines (Brockman)	US¢/DMTu		98.03	107.34	107.34	171.74	171.74	171.74	171.74	120.22	120.22	**46.00**
Yandi fines	US¢/DMTu		92.15	100.90	100.90	161.44	161.44	161.44	161.44	113.01	113.01	**43.24**
PETROLEUM												
Oil (WTI)	US$/bbl	92.31	65.37	61.57	81.90	80.50	79.50	75.00	75.00	75.00	75.00	**75.00**
Oil (Brent)	US$/bbl		64.57	63.65	81.80	80.50	79.50	75.00	75.00	75.00	75.00	**75.00**

Notes:
1. all bulk prices are FOB
2. hard coking coal is BHP Goonyella to Japan; semi-soft coking coal is Hunter Valley to Japan; thermal benchmark is 6,700kcal/kg Chubu contract with Australian shippers
3. LV-PCI: low volatile (<20% volatiles) pulverised coal injection material
4. rutile, synrutile, ilmenite, zircon are average Australian export prices. RBM slag is FOB Richard's Bay
5. forecasts are nominal; long-term prices are real-2007

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Source: Citi Investment Research

Figure 68. Commodity price forecasts – Calendar Year

CALENDAR YEAR		Spot	2002a	2003a	2004a	2005a	2006a	2007a	2008e	2009e	2010e	Long term
AVERAGE EXCHANGE RATES												
A$/US$		0.90	0.54	0.65	0.74	0.76	0.75	0.84	0.84	0.82	0.80	**0.75**
EURO/US$		1.49	0.95	1.13	1.24	1.23	1.26	1.37	1.50	1.44	1.47	**1.10**
US$/ZAR		7.31	10.53	7.57	6.45	6.36	6.76	7.09	7.50	8.10	8.35	**9.50**
PRECIOUS METALS & DIAMONDS												
Gold	US$/oz	934	310	364	409	445	604	694	900	950	1000	**700**
Silver	US$/oz	16.71	4.59	4.89	6.81	7.31	11.57	13.45	15.00	15.50	16.00	**12.00**
Platinum	US$/oz	1690	539	693	846	897	1143	1318	1270	1150	1025	**1000**
Palladium	US$/oz		340	201	228	201	319	401	370	300	300	**300**
Rhodium	US$/oz		841	569	933	1987	4496	5419	6185	4500	3500	**3000**
BASE METALS												
Aluminium	US¢/lb	119	61	65	77	86	117	120	120	120	90	**80**
Alumina: LT contract/Aust export	US$/t		160	177	221	243	343	357	379	385	286	**220**
Copper	US¢/lb	325	71	81	130	167	305	324	308	350	300	**145**
Molybdenum	US$/lb		4.08	5.30	15.15	32.66	24.57	30.37	32.00	20.00	10.00	**8.00**
Nickel	US$/lb	12.45	3.07	4.37	6.29	6.69	11.01	16.86	10.25	8.00	6.00	**6.00**
Cobalt	US$/lb		7	11	24	16	18	29	35	14	10	**8**
Zinc	US¢/lb	105	35	38	48	63	148	148	104	100	100	**60**
Lead	US¢/lb	124	21	23	40	44	58	115	113	110	90	**30**
Uranium	US$/lb		10	11	18	27	47	99	113	110	80	**25**
INDUSTRIAL MINERALS												
Mineral Sands												
Rutile	US$/t		449	434	444	455	480	484	515	530	530	**500**
Zircon	US$/t		348	408	503	615	755	785	758	700	650	**550**
Ilmenite	US$/t		77	82	75	75	80	84	96	105	105	**95**
Synrutile	US$/t		316	384	385	408	406	417	430	440	440	**470**
RBM Chloride Slag	US$/t		411	401	389	378	402	411	410	440	450	**400**
TiO2 Pigment	US$/t		1624	1749	1758	1843	1865	1905	2000	2100	2100	**1,900**
Borates												
Boric Acid (56% B2O3)	US$/t		812	812	824	835	848	837	800	800	800	
Fertilisers												
DAP	US$/t		158	178	214	246	252	308	390	370	350	**300**
COAL												
Contract prices												
Asia												
Hard coking benchmark	US$/t		46.76	46.68	55.95	108.55	117.50	101.50	174.25	185.00	165.00	**120.00**
Semi soft benchmark	US$/t		33.79	31.55	40.05	63.26	61.00	63.06	124.94	111.25	92.50	**57.00**
Thermal benchmark	US$/t		32.51	29.60	37.85	49.59	52.50	54.86	88.91	85.00	80.00	**50.00**
LV-PCI	US$/t		35.79	33.55	42.05	78.76	72.75	67.49	144.41	140.00	107.50	
Europe												
Hard coking benchmark	US$/t		52.35	52.85	63.95	110.66	117.50	101.50	174.25	185.00	165.00	**120.00**
Semi soft benchmark	US$/t		35.75	33.75	42.25	65.46	63.20	65.26	127.14	113.45	94.70	**57.00**
Spot prices												
Thermal Asia	US$/t	90.15	25.68	26.27	53.42	48.04	48.85	64.91	100.00	85.00	80.00	**50.00**
Thermal Europe	US$/t	95.27	25.36	30.53	53.63	45.48	50.41	62.46	100.00	85.00	80.00	**54.00**
IRON ORE												
Asia												
Lump (Brockman)	US¢/DLTu		36.61	38.55	44.85	71.71	91.46	102.05	151.26	166.91	129.35	**50.00**
Fines (Brockman)	US¢/DLTu		28.46	30.19	35.14	56.18	71.65	79.95	118.50	130.76	101.34	**40.00**
Yandi fines	US¢/DLTu		26.75	28.38	33.02	52.80	67.35	75.14	111.37	122.89	95.24	**37.60**
Europe												
Lump (Brockman)	US¢/DMTu		44.68	48.66	57.71	98.97	117.77	128.96	206.33	206.33	144.43	**56.00**
Fines (Brockman)	US¢/DMTu		37.16	40.50	48.03	82.38	98.03	107.34	171.74	171.74	120.22	**46.00**
Yandi fines	US¢/DMTu		34.93	38.07	45.15	77.43	92.15	100.90	161.44	161.44	113.01	**43.24**
PETROLEUM												
Oil (WTI)	US$/bbl	92.31	26.09	31.10	41.47	56.50	66.10	71.73	80.00	75.00	75.00	**75.00**
Oil (Brent)	US$/bbl		25.05	28.49	37.98	55.03	65.28	72.73	80.00	75.00	75.00	**75.00**

Notes:
1. all bulk prices are FOB
2. hard coking coal is BHP Goonyella to Japan; semi-soft coking coal is Hunter Valley to Japan; thermal benchmark is 6,700kcal/kg Chubu contract with Australian shippers
3. LV-PCI: low volatile (<20% volatiles) pulverised coal injection material
4. rutile, synrutile, ilmenite, zircon are average Australian export prices. RBM slag is FOB Richard's Bay
5. forecasts are nominal; long-term prices are real-2007

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Source: Citi Investment Research

Figure 69. Commodity price forecasts – June Year

JUNE YEAR		Spot	2002a	2003a	2004a	2005a	2006a	2007a	2008e	2009e	2010e	Long term
AVERAGE EXCHANGE RATES												
A$/US$		0.90	0.52	0.58	0.71	0.75	0.75	0.78	0.85	0.83	0.81	**0.75**
EURO/US$		1.49	0.90	1.06	1.19	1.27	1.21	1.30	1.47	1.46	1.46	**1.10**
US$/ZAR		7.31	10.14	9.05	6.90	6.21	6.40	7.19	7.26	7.80	8.23	**9.50**
PRECIOUS METALS & DIAMONDS												
Gold	US$/oz	934	289	334	389	423	527	638	815	925	975	**700**
Silver	US$/oz	16.71	4.49	4.61	5.96	6.95	9.28	12.83	14.20	15.25	15.75	**12.00**
Platinum	US$/oz	1690	486	610	790	854	1020	1206	1333	1210	1100	**1000**
Palladium	US$/oz		394	255	219	201	264	340	407	335	300	**300**
BASE METALS												
Aluminium	US¢/lb	119	62	62	71	82	102	122	117	120	105	**80**
Alumina: LT contract/Aust export	US$/t		164	164	199	232	295	357	362	382	336	**220**
Copper	US¢/lb	325	69	72	106	143	229	320	328	325	325	**145**
Molybdenum	US$/lb		3.00	4.65	8.24	26.94	27.21	27.15	33.18	25.00	15.00	**8.00**
Nickel	US$/lb	12.45	2.69	3.48	5.58	6.78	7.03	17.20	11.98	9.00	7.00	**6.00**
Cobalt	US$/lb		8	8	20	19	15	24	38	19	12	**8**
Zinc	US¢/lb	105	36	35	44	53	96	167	119	103	100	**60**
Lead	US¢/lb	124	21	20	32	44	49	76	129	110	100	**30**
Uranium	US$/lb		10	10	14	21	36	77	96	120	95	**25**
INDUSTRIAL MINERALS												
Mineral Sands												
Rutile	US$/t		482	441	438	449	468	481	491	530	530	**500**
Zircon	US$/t		346	371	450	567	673	787	776	725	675	**550**
Ilmenite	US$/t		72	78	78	76	78	82	88	103	105	**95**
Synrutile	US$/t		306	346	389	398	408	409	420	440	440	**470**
RBM Chloride Slag	US$/t		391	413	390	383	390	406	413	425	445	**400**
TiO2 Pigment	US$/t		1675	1709	1729	1813	1848	1890	1958	2050	2100	**1,900**
Borates												
Boric Acid (56% B2O3)	US$/t		812	812	812	835	839	837	780	800	800	
Fertilisers												
DAP	US$/t		148	168	196	223	258	250	378	380	360	**300**
COAL												
Contract prices												
Asia												
Hard coking benchmark	US$/t		44.09	47.63	49.45	75.65	122.50	110.50	122.75	195.00	175.00	**120.00**
Semi soft benchmark	US$/t		35.26	32.55	34.05	49.79	67.00	59.69	84.81	133.75	97.50	**57.00**
Thermal benchmark	US$/t		33.84	31.10	31.85	43.76	52.50	53.29	66.74	95.00	80.00	**50.00**
LV-PCI	US$/t		37.26	34.55	36.05	56.29	84.25	67.16	93.24	160.00	122.50	
Europe												
Hard coking benchmark	US$/t		51.35	52.85	56.55	81.99	122.50	110.50	122.75	195.00	175.00	**120.00**
Semi soft benchmark	US$/t		36.75	34.75	36.25	51.99	69.20	61.89	87.01	135.95	99.70	**57.00**
Spot prices												
Thermal Asia	US$/t	90.15	29.26	24.00	39.67	53.78	46.85	51.39	87.60	95.00	80.00	**50.00**
Thermal Europe	US$/t	95.27	28.52	25.01	42.19	52.38	47.48	51.08	86.53	95.00	80.00	**54.00**
IRON ORE												
Asia												
Lump (Brockman)	US¢/DLTu		37.56	36.94	41.18	55.02	83.86	97.53	119.96	166.91	154.39	**50.00**
Fines (Brockman)	US¢/DLTu		28.81	28.92	32.27	43.11	65.70	76.41	93.98	130.76	120.95	**40.00**
Yandi fines	US¢/DLTu		27.08	27.19	30.33	40.51	61.75	71.81	88.33	122.89	113.68	**37.60**
Europe												
Lump (Brockman)	US¢/DMTu		45.86	46.67	53.18	78.34	108.37	123.36	167.65	206.33	175.38	**56.00**
Fines (Brockman)	US¢/DMTu		37.61	38.83	44.27	65.20	90.20	102.68	139.54	171.74	145.98	**46.00**
Yandi fines	US¢/DMTu		35.36	36.50	41.61	61.29	84.79	96.52	131.17	161.44	137.22	**43.24**
PETROLEUM												
Oil (WTI)	US$/bbl	92.31	23.72	29.86	33.79	48.76	64.18	63.47	81.20	77.25	75.00	**75.00**
Oil (Brent)	US$/bbl		23.24	27.46	30.98	46.46	62.92	64.11	81.15	77.25	75.00	**75.00**

Notes:
1. all bulk prices are FOB
2. hard coking coal is BHP Goonyella to Japan; semi-soft coking coal is Hunter Valley to Japan; thermal benchmark is 6,700kcal/kg Chubu contract with Australian shippers
3. LV-PCI: low volatile (<20% volatiles) pulverised coal injection material
4. rutile, synrutile, ilmenite, zircon are average Australian export prices. RBM slag is FOB Richard's Bay
5. forecasts are nominal; long-term prices are real-2007

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Source: Citi Investment Research

Notes

Notes

Appendix A-1

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