

# Coal Supply: Bottlenecks, Challenges and Opportunities

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## Summary.

Historically, bottlenecks in the supply chain of coal to World markets tend to be short lived. This situation is unlikely to change over the long haul, however there will be circumstances that will provide hurdles from time to time resulting in changes to trade flows and impacting on the market. Who knows what will occur in the five months which will pass between when this paper is written and the date of the conference. In broad terms I see the following developments in the period to 2010:

- Imported metallurgical coal demand increasing at 1.5% per annum to about 213 million tonnes in 2010.
- Within this segment the demand for coal for PCI purposes will increase at a rate of 3% per annum and reach a figure of 42 million tonnes by 2010.
- The coals for coke oven blends will increase at a rate of 1.1% per annum to about 171 million tonnes.
- At least in the next five years the growth in demand is likely to be for the medium and low volatile coals.
- We forecast that US exports of met coal will decline to less than 20 Mtpa. However the US industry clearly has enormous potential capacity and any slump in domestic demand can free coal for the export market. An interesting factor limiting the ability of the US industry to expand short term seems to be the age profile of employees and resulting shortage of young experienced miners.
- Recent and planned closures in Canada will reduce that country's export capacity, however the major companies that continue to operate will be competitive suppliers of met coal.
- China is the wild card in the coal market for both met and thermal coal. Barlow Jonker has been studying the Chinese industry in detail in 2000 and this work should provide some leads as to the future. In the past export capacity has been limited by the capacity of infrastructure and exporters have concentrated on supplying Japan. The country has coal of excellent quality and with Capesize loading facilities now available there is scope for China to supply distant markets.
- Australia will remain the largest supplier of export met coal. It can with comparative ease increase total met coal exports from 101 Mt in 2000 to at least 130 Mt by 2010.
- Mines are a bit like the deck chairs on a liner in that different people sit in them from time to time. These have been many changes to ownership in the last couple of years but the same mines go on producing and have new projects join them from time to time. Such a situation will go on. The interesting thing to watch will be the marketing strategy of BHP Billiton and Anglocoal in whose hands rests a very large proportion of prime quality export met coal.

## Seaborne metallurgical coals, supply & demand issues.

### 1) Overall Demand

The current seaborne metallurgical coal trade is almost completely dependent upon iron and steel production in the world outside Central & Eastern Europe, the C.I.S. (Former USSR), North

America and China. The growth in Chinese steel production will not be accompanied by increased import demand for coking coal as domestic coal resources are large and of good quality. Internal growth in demand in China for coking coal has in the past curbed the growth in exports of coking coal. In recent years instead of increasing coking coal exports the country has rapidly been increasing its coke exports, becoming the largest exporter in the world at 15 Mtpa of coke.

The majority of growth in the seaborne metallurgical import coal demand will arise in the following countries.

- Korea and Taiwan,
- Other Asia, particularly in India,
- South America, particularly Brazil,
- Germany, particularly after 2005.

The import demand for metallurgical coal has been placed in two broad categories, being:

- a) coal for the coke oven blend, and
- b) coal for pulverised coal injection (PCI) of the blast furnace.

Coke oven blend, or coking coal therefore includes semi, soft, and hard coking coal. Thermal coal used for Corex plants has not been included in these estimates because of the relatively low volumes. A summary of current and projected trends in metallurgical coal imports is presented in Table 1, whilst Tables 2 and 3 show the PCI coal and blend coal trends which make up the total metallurgical coal trade.

**Table 1 -Imported Metallurgical Coal Demand per Region (Mt).**

Region/Area	1985	1990	1995	1999	2000	Forecast		
	2001	2005	2010					
North Asia	83	91	96	97	103	96	97	90
Other Asia	3	7	12	10	13	15	19	25
European Union -12	40	44	40	40	43	44	43	49
Other Europe	17	19	17	16	16	17	17	17
Mid. East/Africa	5	6	8	9	10	11	12	16
America/Pacific	17	17	20	22	23	24	26	28
Total	166	183	194	194	207	207	214	225
<b>Seaborne trade</b>	<b>144</b>	<b>165</b>	<b>172</b>	<b>174</b>	<b>184</b>	<b>190</b>	<b>200</b>	<b>213</b>

The projections show that the seaborne trade in metallurgical coals over the period 2000 to 2010 will grow at a rate of 1.5% p.a. The metallurgical coal imports can be split into PCI imports and coke oven blend coals as per the following two tables.

**Table 2 -Imported PCI Coal Demand by Region (Mt).**

Region	1998	1999	2000	2001	2005	2010
			prov.	Fore cast	Fore cast	Forecast
North Asia	13.55	14.71	15.76	16	19	20
Other Asia	0.3	0.54	0.79	1	2	3
EU 12	7.07	8.37	8.81	9	9	12
Other Europe	0.65	0.73	0.88	1	1	1
Mid. East/ Nth Africa	0.65	0.78	0.97	1	1	1
Americas Pacific	2.05	2.95	3.85	4	4	4
<b>PCI COAL TOTAL</b>	<b>24.27</b>	<b>28.08</b>	<b>31.06</b>	<b>32</b>	<b>37</b>	<b>42</b>

The seaborne PCI coal trade is projected to grow at 3.0% p.a. over the period 2000 to 2010. Note that the category Middle East/North Africa represents one country only, Turkey, with other countries in this region not importing PCI coals.

**Table 3 -Imported Coke Oven Blend Coal Demand per Region (Mt).**

Region	1998	1999	2000	2001	2005	2010
			prov.	Forec ast	Forec ast	Forec ast
North Asia	84.3	82.4	87	80	78	70
Other Asia	10.5	10	11.7	14	17	22
EU 12	35.5	31.3	33.4	37	33	37
Other Europe	15.7	15.2	14.4	16	16	16
Mid. East/ Nth Africa	8.7	8.1	9	9	11	15
Americas Pacific	18.7	19	19	18	22	24
<b>Total</b>	<b>173.3</b>	<b>166</b>	<b>175.8</b>	<b>173</b>	<b>178</b>	<b>183</b>
<b>Seaborne</b>	<b>154.7</b>	<b>145.4</b>	<b>153</b>	<b>157</b>	<b>163</b>	<b>171</b>

The seaborne coking blend coal trade is projected to grow at 1.1 % p.a. over the period 2000 to 2010.

The following tables set out historical and forecast demand for metallurgical coal by VM type.

**Table 4 – Import demand by coal type.**

Demand for imported Metallurgical Coal by VM type for each region.				
Million tonnes		HV	MV	LV
	1995	1995	1995	1995
Region/Area				
North Asia	95.80	23.44	41.23	31.13
Other Asia	12.17	0.75	5.88	5.54
European Union -12	40.23	6.63	16.19	17.41
Other Europe	17.32	1.42	9.29	6.60
Mid. East/Africa	8.21	0.47	4.67	3.06
America/Pacific	20.43	4.60	9.97	5.86
<b>Total</b>	<b>194.15</b>	<b>37.31</b>	<b>87.24</b>	<b>69.60</b>

Demand for imported Metallurgical Coal by VM type for each region.				
Million tonnes	provisional	HV	MV	LV
	2000	2000	2000	2000
Region/Area				
North Asia	102.494	29.15	44.54	28.80
Other Asia	12.82	1.02	6.20	5.60
European Union -12	42.596	8.13	16.33	18.14
Other Europe	16.239	1.44	8.68	6.11
Mid. East/Africa	9.84	0.70	5.73	3.41
America/Pacific	22.847	5.33	11.07	6.46
<b>Total</b>	<b>206.836</b>	<b>45.78</b>	<b>92.54</b>	<b>68.52</b>

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<b>Demand for imported Metallurgical Coal by VM type for each region.</b>				
Million tonnes		HV	MV	LV
	2005	2005	2005	2005
Region/Area				
North Asia	96.49	26.59	42.56	27.34
Other Asia	19.8	2.07	10.07	7.66
European Union -12	42.76	8.73	16.51	17.52
Other Europe	17.2	1.71	9.14	6.35
Mid. East/Africa	12.0	0.88	6.97	4.15
America/Pacific	26.1	5.87	12.64	7.58
<b>Total</b>	<b>214.35</b>	<b>45.85</b>	<b>97.91</b>	<b>70.60</b>

Growth in demand in the next 5 years will be in medium and low volatile matter coal, with high volatile matter coal demand approximately unchanged.

## **2. But by whom and how will this coal be supplied?**

The USA is a reluctant exporter, with exports likely to decline by 5 to 10 Mtpa.

Canada is working hard to contain losses in export capacity, and seaborne exports are expected to decline by 3 to 4 Mtpa.

Australia can and will expand to balance supply losses elsewhere..

China could become a new supply force after 2005, going from 5 Mtpa in 2000 to 15 Mtpa by 2010.

Poland and Russia will remain landborne exporters to neighbouring countries.

### **The USA.**

Regardless of the state of the US domestic steel industry, US domestic prices are now related to the demand for low sulphur bituminous coals, so called compliance coals, in the power industry.

Following the recent drastic power shortages in California and the election of president Bush a few months ago it has become clear that coal fired electricity supply will be boosted with new power stations and that low sulphur metallurgical coals will obtain a price premium domestically which makes exports at prices less than US\$50/tonne FOB vessel uninteresting and uneconomic. In 1999 and 2000 seaborne exports were just over 25 Mtpa and this is expected to remain a ceiling level of exports with the likelihood that these will decline into a 15 to 20 Mtpa range. However if a slump in domestic demand will occur then the USA has the mine, rail and port capacity to double exports within a few months.

### **Canada.**

The 1999 and 2000 closures of Smoky River, Gregg River and Quintette mines, coupled with the planned closure of Bullmoose and Cardinal River after 2002, will represent a closure of export capacity of 11 Mtpa by 2003. No new projects are planned to start up with the only significant potential project, Cheviot, deferred indefinitely. However increased production at Fording River, Elkview and Line Creek will be adding 7 Mtpa of export output. Canada in the years ahead will therefore be exporting at approximately 3 to 4 Mtpa less than in the late nineties. We estimate that seaborne exports will level out at 27 Mtpa.

### **China.**

China, as a country, has the largest known coal resources in the world. The coal resources range from anthracites to the full range of coking coals (low, medium and high volatile matter). The country's exports over the past decade have been spasmodic and of variable quality. The construction of rail and port infrastructure will assist the country's export industry. Quality control at mines, new washery capacity and improved mining equipment will assist in improving quality consistency. In recent years Chinese coking coal exports have been restricted to the Japanese and Korean markets, never exceeding 5 Mtpa. In recent years the monopoly supply position of CNCIEC

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has been broken and individual provincial coal bureaus are now exporting coal. We expect that this increased competition and the ability to load Cape size vessels will expand the economic markets for the Chinese exporters.

### Australia.

The underground coking coal mines in New South Wales, shipping via Port Kembla, are not expected to increase exports. The growth in exports of hard coking coal will come from the Bowen Basin in Queensland.

Based on known mine capacities, mines under development and development plans the following coking coal export capacities are estimated for Australia. Note that 1998 and 1999 data are actual exports, not capacities. High costs in southern N.S.W. are the reason that the large capacity of 8.1 Mtpa is only used for about 50%. With current prices actual hard coking coal exports from N.S.W. are expected to be less than 4 Mtpa.

**Table 5 – Supply potential from Australia by coking coal type.**

Coal type	1998	1999	2000	2001	2005	2010
		Exports		Capacity	→	
	Mt	Mt	Mt	Mt	Mt	Mt
NSW hard/semi-hard	4.1	4.0	4	4	4	4
QLD hard/semi-hard	60.5	68.7	77	81	91	100
<b>Total hard/semi-hard</b>	<b>64.6</b>	<b>72.7</b>	<b>81</b>	<b>85</b>	<b>95</b>	<b>104</b>
NSW semi-soft/PCI	17.4	19.6	20	24	25	26
<b>Total AUS</b>	<b>82.0</b>	<b>92.4</b>	<b>101</b>	<b>109</b>	<b>120</b>	<b>130</b>

### 3. Cost competitiveness.

The following table shows estimated landed costs to major metallurgical markets for Australian, USA and Canadian exporters based on average sea freight rates and weighted average FOB mine costs.

**Table 6 - Indicative Comparative Landed Costs - US\$ Per Tonne**

Origin	Weighted Average FOB Cash Cost (US\$/t)	C&F Weighted Avg. Cash Cost (US\$/t) <sup>2</sup>	C&F Weighted Avg. Cash Cost (US\$/t) <sup>2</sup>
		Japan	Brazil, Europe (ARA)
Australia	22.40	31.65/28.90	39.90/34.90
Canada	32.00	42.25/39.50	49.75/46.00
USA East Coast	39.52	59.52/na	47.27/45.52

*Note 1:* -The following exchange rates were used in the conversion of Australian and Canadian dollars to US dollars: A\$1=US\$0.58, C\$1=US\$0.68

*Note 2:* The table shows C&F cash cost respectively for Panamax and Cape size vessels.

### 4. Demand supply balance.

The following table shows forecast metallurgical supply to 2010 to match forecast import demand. No expansions are forecast for Canada and the USA, because of their inability to compete with Australia at current prices.

**Table 7 - Actual and Forecast Supply of Seaborne Metallurgical Coal to 2010 (Mt)**

Country	1999	2000	2005	2010
Australia	92	101	116	125
USA	25	26	22	23
Canada	29	27	27	25
China	5	6	10	15
South Africa	3	3	3	3

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Indonesia	6	6	6	6
Other	13	14	16	16
<b>Total Supply</b>	<b>173</b>	<b>184</b>	<b>200</b>	<b>213</b>

### 5. Mergers and acquisitions in the Australian coal industry.

In the past few years mergers and acquisitions have been significant in the Australian coal industry. In the metallurgical industry new companies have emerged, such as Anglo Coal, Rio Tinto, RAG and Wesfarmers, while others have exited the industry, such as ARCO, Shell, Sumitomo Corporation, QCT Resources. A comparison of mine ownership in 2001 versus 1999 is presented in the table below.

**Table 8 – Metallurgical coal exports from Queensland, managed per company.**

Company	1999	1998/1999	2001	2000/2001
	No. of mines	Exports (Mt)	No. of mines	Estimated Exports (Mt)
BHP	9	35	11	36
M.I.M.	3	7.1	4	9
<i>ARCO</i>	<i>2</i>	<i>1.9</i>	<i>0</i>	<i>0</i>
<i>Shell</i>	<i>4</i>	<i>6.7</i>	<i>0</i>	<i>0</i>
<i>QCT Resources</i>	<i>3</i>	<i>4.5</i>	<i>0</i>	<i>0</i>
<i>Sumitomo Corp.</i>	<i>1</i>	<i>2.1</i>	<i>0</i>	<i>0</i>
Rio Tinto	0	0	2	6
RAG	0	0	2	6.5
Anglo Coal	0	0	4	9
Wesfarmers	0	0	1	3

Companies which have exited the industry are in *bold italics*.

Note that only 2 companies, BHP and MIM, remain from 1999. Four companies have exited and four have entered.