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Development and Perspectives of the Australian Coal Supply Chain and Implications for the Export Market

Abstract

The Australian coal industry is critical for the nation's domestic energy supply and economy with an export value of almost A\$24 bn in the fiscal year 2007/08. With almost 75% of production destined to the export market, Australia is also the world's largest hard coal exporter and an essential secure source of energy particularly to meet both thermal and metallurgical coal demand in the fast growing Pacific Rim.

This paper examines the Australian mining sector prospects to retain its position as the world's largest coal exporter in the mid-term, by analysing the potential increases in export capacity along the coal supply chain through expansions in mine, rail and port capacities. Despite current financial challenges and restrictions, the authors conclude that export volumes, depending on demand, could rise by 50% in the period to 2014.

Die Kohleindustrie spielt für die australische Wirtschaft eine zentrale Rolle. Dies gilt sowohl für die inländische Energieversorgung aber auch vielmehr für die volkswirtschaftliche Bedeutung, da mit der Kohle ein Exportwert von annähernd 24 Mrd. AUD verbunden ist (als Geschäftsjahr 2007/08). Mit diesem Exportvolumen, welches annähernd 75% der produzierten Menge darstellt, ist Australien zugleich einer der weltgrößten Steinkohle-Exporteure und eine wichtige Stütze der globalen Energieversorgung. Insbesondere bei der Deckung der schnell wachsenden Nachfrage nach Kraftwerks- und Koks-kohle im pazifischen Raum ist der Exporteur Australien von großer Bedeutung.

Dieser Artikel diskutiert die Perspektiven des australischen Minensektors, seine dominante Position als weltgrößter Kohle-Exporteur auch mittelfristig beizubehalten. Dabei wird aufbauend auf der Analyse der Exportkapazität sowie deren Erweiterungen entlang der Kohlelieferkette von den Gruben, über die Bahnlogistik als auch die Hafenskapazitäten das zukünftige Exportpotenzial abgeschätzt. Ungeachtet der gegenwärtig schwierigen Lage an den Finanzmärkten kommen die Autoren zu dem Schluss, dass das Exportvolumen im Zeitraum bis 2014 - abhängig von der Nachfrage - um bis zu 50% steigen könnte.

Introduction

Despite the financial crisis and falling price levels for global commodities, investment in the Australian mining and metals sectors continues to move forward as measured through higher new capital expenditures in the industries. Total new capital expenditures in the total mining sector (metals, coal, etc.) were estimated at A\$36.7 bn (approx \$28.45 bn) in fiscal year 2008/09 in an Australian Bureau of Statistics (ABS) survey or 14% above 2007/08. The budgeted capital expenditures for ad-

vanced coal mining and infrastructure projects, which are under construction or financing is committed, remained flat, compared to the last report released in October 2008 at nearly A\$10.4 (approx \$8 bn). The large amount of mining capacity coming online in the mid-term also encourages investment in coal chain capacity with five rail expansions and seven port expansions committed and under construction with an estimated capital cost of A\$4.5 bn (approx \$3.5 bn).

This paper reviews the Status Quo of the Australian coal mining industry and iden-

tifies the logistical bottlenecks in the rail sector and port congestion issues, as well as, its effects of these infrastructural problems on Australia's export capacities. The planned expansion projects and recent investments into the coal supply chain to overcome short and long term restrictions are evaluated on top of the growth of mining capacity. Further, the authors discuss the impact of recent developments like the global crisis, the reaction of the Australian government by implementing stimulus packages and the introduction of carbon dioxide emission trading schemes on the Australian coal mining industry.

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Fig. 1 | Australian Coal Exports 2000 to 2009 (extrapolated)

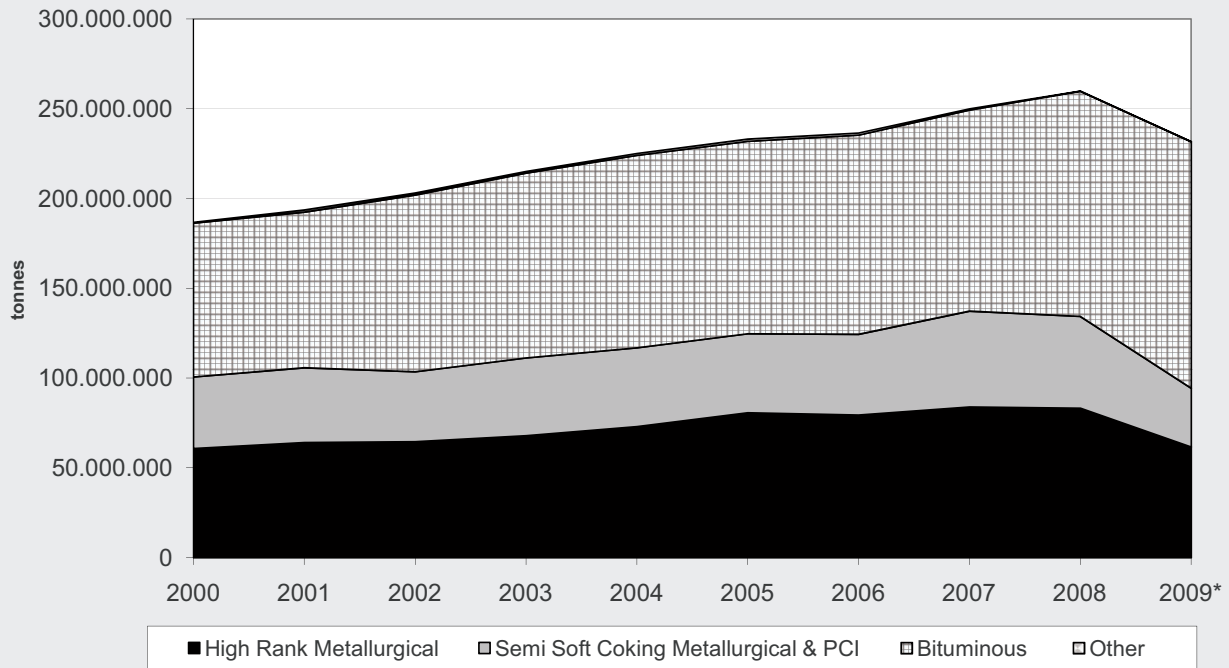


Fig. 2 | Development of Australian Export Coal Prices

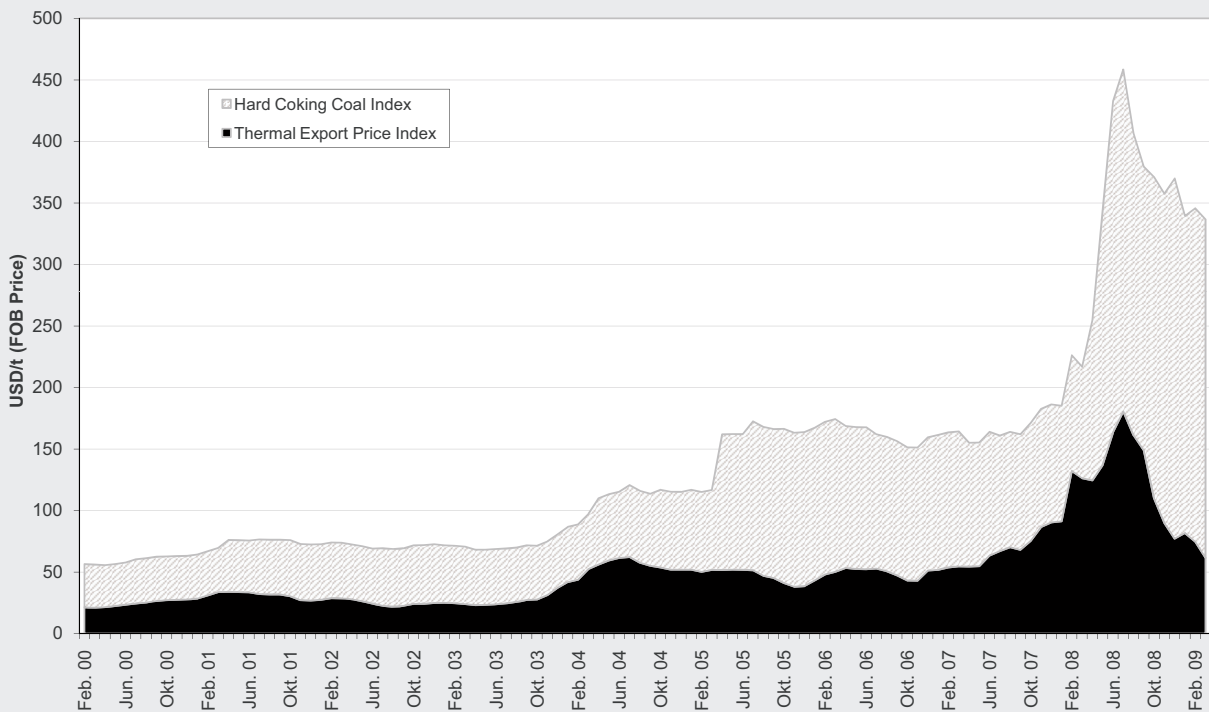
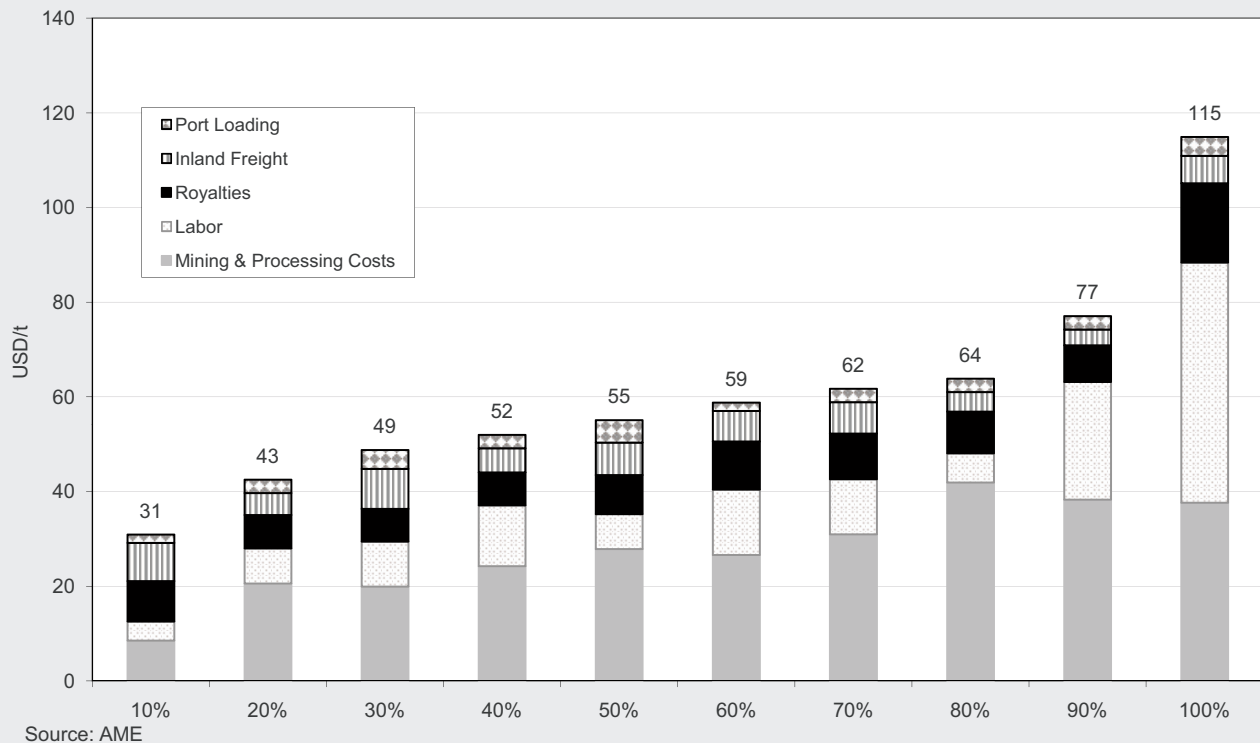


Fig. 3 | Cost Curve - Cash Costs for FOB Australian Thermal Coal Production (2008) according to AME

Overview of the Australian Coal Mining Industry and Coal Supply Chain

Australia is the largest exporter of metallurgical coal with almost 60% of market share and the second largest exporter of thermal coals with approximately 20% of market share globally. Exports hit a new record high of almost 260 mt (million metric tons) in 2008 with trade being equally split between thermal and metallurgical/PCI qualities. The seaborne trade brings in royalties for the states New South Wales and Queensland as well as revenue from leasing and operating assets for inland transport. The export industry has grown by 4% annually since 2000, but exports are expected to temporarily fall by 10% in 2009.

In Q1 09, metallurgical coal exports were down over 20% in response to a slump in steel demand, whereas, steam coal exports rose 17% year-on-year as shippers shifted export volumes where possible. In Figure 1, the development of Australian coal exports from 2000 to present are depicted with the level of 2009 exports annualised based on exports to date.

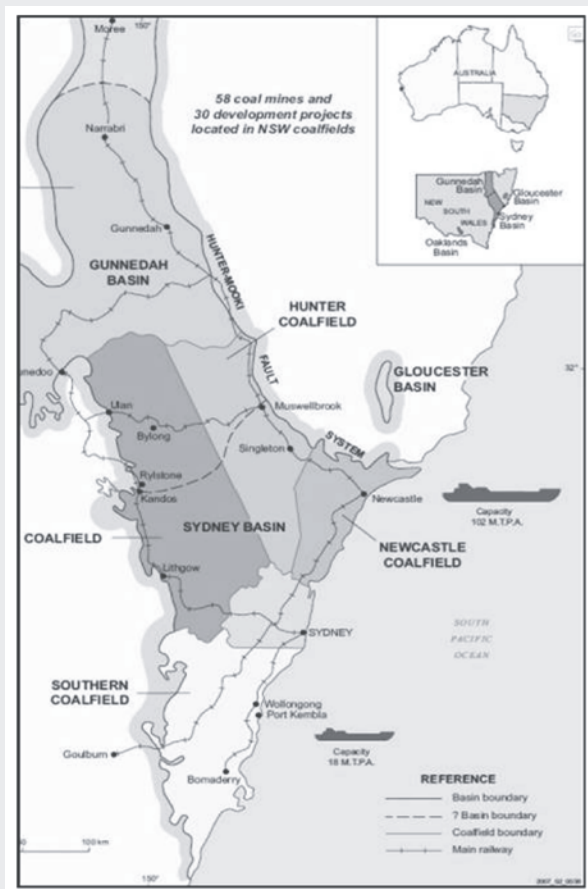
The majority of Australian hard coal export volumes are fixed in annual contract negotiations with Asian partners (i.e. Japan, China, etc) covering the Japanese fiscal year from April to March. As shown in Figure 2, coking coal prices spiked in 2008 to nearly 4x the levels in 2004, as coking coal supplies failed to match the unprecedented growth in rates in global steel production. Besides, exports fell due to bottlenecks in Australian infrastructure and heavy rainfall in Queensland which shut down key mines. Thermal coal purchases are done both in annual contracts and with a growing amount of spot volumes. Thermal prices also reached a peak in 2008 at 2x contract levels and 3x the 2004 spot levels on global supply imbalances as export volumes failed to keep pace with demand from growing coal-fired plants primarily in the Pacific Rim.

In the near future, traded and physical volumes in the thermal market are anticipated to get a boost with the introduction of standard Newcastle fuels contract and coal specifications for traded purposes. The Australian Securities Exchange (ASX) plans to launch the futures and options market in July of 2009, following the launch of GlobalCOAL's ICE Newcastle

contract in December 2008. The contract specifications for the FOB Newcastle futures, where participants are allowed to take physical delivery of purchased coal, include a minimum calorific value of 5,650 kcal/kg for Australian thermal coal, maximum ash of 17% and maximum sulphur of 1%. Future contracts will cover four calendar years and options will have products for the first three quarters and four calendar years.

Mining production costs in Australia vary widely depending on the mine type and location. Still, an estimate by AME Energy Economics of the thermal cash costs on FOB basis shows that that 70% of current thermal production were below US\$70/t in the 2008 reference years. In Figure 3, the largest price proportion of costs are made up of labour (10-45%), as well as, mining & processing costs (30-66%) being a function of mine depth, overburden and conditions. The smaller price drivers are royalties – usually between US\$7-10/t – and port loading charges (US\$2-4/t). Inland freight costs vary significantly depending on the distance to the port and individual rail contracts. Still, with Newcastle FOB forward prices for 2010-2012 trading above US\$75/t in May

Fig. 4 | Overview of the New South Wales coal mining districts



2009, thermal coal production for the majority of Australian coal producers remains a profitable commodity compared to other global mining and mineral products.

The existing coal chain capacity and competitive pricing should secure Australia's place as the leading seaborne hard coal exporter in the mid-term, but it will likely remain a key source for long-term sources for global thermal and metallurgical coal qualities due to the large quantities of high quality coal reserves and resources. According to the Federal Institute for Geosciences and Natural Resources 2007 report, Australia currently has 39,600 mt of hard coal reserves or approximately 5.6% of total global reserves. In addition, the country is estimated to have another 148,200 mt in resources. Based on 2007 production levels of 323 mt, the country has almost 460 years of remaining poten-

tial for hard coal mining. Australia's lignite and sub-bituminous coal reserves (37,300 mt) and resources (173,500 mt) are even more abundant representing over 2,900 years of current production.

The Australian coal mining industry is primarily concentrated in two states: New South Wales (NSW) and Queensland (QLD), with the former delivering predominantly thermal coal qualities and the latter coking coal qualities. In the next sections of the paper, an in depth look at the coal chain capacity in these two mining regions is presented. The summary tables are based on the collection of colliery level details for existing mines and announced projects from information sources (see bibliography) which are updated regularly throughout the past year. Mining parameters collected for each entry include (as available): country and coal field, mine name and operator, total production

and export capacity by coal type and mine/project status and closures. In this respect, the paper builds upon the earlier analytical methods and previous work of H. Gruss (1989-2003), C. Kopal (2006-2007) and M. Rademacher (2008) published in the Zeitschrift für Energiewirtschaft.

From the infrastructural point of view both major coal exporting states differ. Whereas the NSW ports are state owned but leased to private operators, Queensland ports are operated by both State owned enterprises and through leasing by privately owned businesses. The private company Australian Rail Track Corporation (ARTC) operates the NSW rail system on a leasing basis, contrary to the state owned company Queensland Rail, which run the QLD system.

Still the philosophy behind the operations is in flux. Traditionally the state provided infrastructure which was inefficient and costly. More recently users have demanded a more competitive industry rather than state owned monopolies. Consequently assets are leased and those retained being more effective, with charges reflecting the real costs of development and operating infrastructure. Another major change has been the realisation that timely construction of infrastructure will only happen when the user pays, with a form of 'take or pay' contracts to guarantee long-term haulage volumes now expected to become the normal method of business negotiations. There is still time needed before this business practice and contractual change becomes the standard contract of business. The industry is therefore now looking forward with a more holistic and integrated view that manages the coal from mine to ship rather than localised infrastructure that is mismatched and ineffective.

Whereas export mine capacity can be impacted by geological issues and in some cases design, port capacities are constrained at least currently due to upgrading and delays caused by late reaction to demand. On the other hand, rail infrastructure has the ability to operate (at least for short periods) above 100% of the theoretical utilization. Still the restrictions in the rail segment of the supply chain are faced with growing problems as capacity increases, and it is important to highlight the efforts undertaken by all stakeholders to generally improve the existing capaci-

Tab. 1 | Committed New Export Mines

Country / Mine	Company / Operator	Mine Type	Mining Capacity				Committed New Capacity (where available)					
			Coking Coal	Semi-soft Coking Coal	Thermal Coal	Total	2008	2009	2010	2011	2012	2013
Airly	Centennial Coal	U/G			1,8	1,8			1,8	1,8	1,8	1,8
Ashton	Felix Resources	U/G		1,7		1,7						
Avondale	Zelos Resources	U/G	0,9			0,9	0,9	0,9	0,9	0,9	0,9	0,9
Bulga (South Blakefield)	Xstrata Coal Australia	U/G			5,0	5,0		0,3	1,5	3,0	3,0	5,0
Mangoola (Anvil Hill)	Xstrata Coal Australia	O/C			6,5	6,5				3,0	4,5	6,0
Narrabri North Stage I	Whitehaven Coal Mining	U/G			2,5	2,5		1,0	2,5	2,5	2,5	2,5
Sunnyside	Whitehaven Coal Mining	O/C			1,0	1,0		0,5	1,0	1,0	1,0	1,0
New South Wales			0,9	1,7	16,8	19,4	0,9	2,7	7,7	12,2	13,7	17,2
Clermont	Rio Tinto Coal Australia	O/C			12,2	12,2			2,0	6,0	8,0	12,2
Daunia	BHP Billiton Mitsubishi Alliance J.V.	O/C		4,0		4,0			1,0	4,0	4,0	4,0
Ensham Central	Ensham Resources	U/G			2,0	2,0						
German Creek (Girrah/Lake Lindsay)	Anglo Coal Australia JV	O/C	1,9	1,8	0,3	4,0	2,0	3,0	4,0	4,0	4,0	4,0
Maryborough (Colton)	NEC - Northern Energy	O/C	0,2			0,2		0,1	0,2	0,2	0,2	0,2
New Saraji	BHP Billiton Mitsubishi Alliance J.V.	U/G	5,0			5,0					5,0	5,0
Orive Downs	Macarthur Coal	O/C	2,0			2,0	0,4	1,0	1,6	2,0	2,0	2,0
Queensland			9,1	5,8	14,5	29,4	2,4	4,1	8,8	16,2	23,2	27,4
	Australia, of which	Opencast	4,1	5,8	20,0	29,9	2,4	4,6	9,8	20,2	23,7	29,4
		Underground	5,9	1,7	11,3	18,9	0,9	2,2	6,7	8,2	13,2	15,2
		Total	10,0	7,5	31,3	48,8	3,3	6,8	16,5	28,4	36,9	44,6

ties and to adjust them to the forecasted demand scenarios shown.

Ever increasing demand caused queue numbers to increase due to congestions hampering export capacity as the rail systems as well as the port logistics were not able to realize the required volumes. The number of ships at anchor off the ports rose significantly and peaked at a total of 160 ships in 2007. Even in Q1 2009 the queues off the ports influence the Australian export capacities negatively given the demand pressure from Asian steam coal consumers. These bottlenecks prompted the industry to invest in port and rail infrastructure and look to provide integrated logistics systems for Australian coal industry.

New South Wales

The Australian state of New South Wales produced approximately 138.8 mt of saleable coal in 2008 of which approximately 25% is for domestic consumption. The remainder 101.7 mt is exported into the global market of which the majority of 78% is based in thermal coal.

Within the state, there are approximately 58 coal mines in operation in seven coal basins which extend a length of over 1,300 km as shown in Figure 4 with rail lines for exports out of the Newcastle and Port Kembla ports.

The mining capacity of key coal basins for the export coal market include

- South Coast of the Sydney Coal Basin (4.5 mtpa domestic / 9.5 mtpa export)
- Western District (15 mtpa domestic / 27.5 mtpa export)
- Hunter region (13 mtpa domestic / 70 mtpa export)
- Newcastle (6 mtpa domestic / 15 mtpa exports)
- Gunnedah (8 mtpa export)

The current estimated export capacity within NSW is estimated at approximately 131 mtpa distributed into the following qualities 10% coking coal, 24% semi-soft/PCI qualities and 66% thermal coal qualities. This mining production capacity available for export is up almost 14% or +16.1 mtpa over estimated export capacities published in Rademacher's 2008 report "Development and Perspectives on Supply and Demand in the Global Hard

Coal Market". New mines recently commissioned include the Roclen mine (1.5 mtpa thermal coal), Abel coal mine (4.5 mtpa run-of-mine semi-soft coking coal) as well as the Liddell Coal washplant upgrade. Based on industry trade journals, four mines in NSW are expected to close in 2008/09 with almost 8 mtpa of capacity. These mines include: Xstrata's Cumnock south and Beltana (to be replaced by Blackfield South Mine) as well as Centennial Coal's Newstan (to be on care and maintenance with production partially replaced by other Centennial coal mines) and Whitehaven's Canyon mine (replaced by Gunnedah mine upgrades).

Based on NSW 2008 total coal exports of 101 mt, the capacity utilisation of available export mines was at near 78% down slightly from 83% capacity utilisation the previous year. As a benchmark, H. Gruss's analysis shows that historically mining capacity utilisation rates above 80% are difficult to sustain due to unforeseen problems in logistics, raiing, weather conditions or mine processes. At the mine level, there appears to be few bottlenecks in the NSW coal chain, mostly related to loading

Tab. 2 | Committed Capacity Expansions at Existing Mines or Mines under Construction

Country / Mine	Company / Operator	Mine Type	Mining Capacity				Committed New Capacity (where available)					
			Coking Coal	Semi-soft Coking Coal	Thermal Coal	Total	2008	2009	2010	2011	2012	2013
Airly	Centennial Coal	U/G			1,8	1,8			1,8	1,8	1,8	1,8
Ashton	Felix Resources	U/G		1,7		1,7						
Avondale	Zelos Resources	U/G	0,9			0,9	0,9	0,9	0,9	0,9	0,9	0,9
Bulga (South Blakefield)	Xstrata Coal Australia	U/G			5,0	5,0		0,3	1,5	3,0	3,0	5,0
Mangoola (Anvil Hill)	Xstrata Coal Australia	O/C			6,5	6,5				3,0	4,5	6,0
Narrabri North Stage I	Whitehaven Coal Mining	U/G			2,5	2,5		1,0	2,5	2,5	2,5	2,5
Sunnyside	Whitehaven Coal Mining	O/C			1,0	1,0		0,5	1,0	1,0	1,0	1,0
New South Wales			0,9	1,7	16,8	19,4	0,9	2,7	7,7	12,2	13,7	17,2
Clermont	Rio Tinto Coal Australia	O/C			12,2	12,2			2,0	6,0	8,0	12,2
Daunia	BHP Billiton Mitsubishi Alliance J.V.	O/C		4,0		4,0			1,0	4,0	4,0	4,0
Ensham Central	Ensham Resources	U/G			2,0	2,0						
German Creek (Girrah/Lake Lindsay)	Anglo Coal Australia JV	O/C	1,9	1,8	0,3	4,0	2,0	3,0	4,0	4,0	4,0	4,0
Maryborough (Colton)	NEC - Northern Energy	O/C	0,2			0,2		0,1	0,2	0,2	0,2	0,2
New Saraji	BHP Billiton Mitsubishi Alliance J.V.	U/G	5,0			5,0					5,0	5,0
Orive Downs	Macarthur Coal	O/C	2,0			2,0	0,4	1,0	1,6	2,0	2,0	2,0
Queensland			9,1	5,8	14,5	29,4	2,4	4,1	8,8	16,2	23,2	27,4
	Australia, of which	Opencast	4,1	5,8	20,0	29,9	2,4	4,6	9,8	20,2	23,7	29,4
		Underground	5,9	1,7	11,3	18,9	0,9	2,2	6,7	8,2	13,2	15,2
		Total	10,0	7,5	31,3	48,8	3,3	6,8	16,5	28,4	36,9	44,6

facilities in the Newdell Junctiona area where major shunting is required.

New capacity from a number of new greenfield mining projects and brownfield mine expansions is expected to add +30 mtpa of mining capacity to the state between 2008 and 2014 far outstripping the planned closures. Based on public information sources collected through Q1 09, seven mining projects are identified with resources committed, where construction is currently underway or concrete planning and investment pledged, adding +19 mtpa of total new mine capacity by 2014 with no further project delays. The output of the mines is primarily (85%) based in thermal coal qualities (**Table 1: Committed New Export Mines**). An additional +10.7 mtpa of mining capacity is to be added in eight other expansions projects at existing mines or at mines currently under construction as shown in **Table 2 (Committed Capacity Expansion at Existing or New Mines)**.

More uncertain potential capacity additions are also tracked for projects in planning, or where the project is in a planning stage and/or financing and milestones are still withstanding or not yet publicly an-

nounced. In NSW, there are over 20 projects for new mines in planning which could potentially add +50 mtpa of new export capacity with the majority (70%) made up of thermal qualities. These projects are expected to go forward when market conditions and the necessary port and rail infrastructure investment commitments are available. A list of these projects is available in **Table 3 (Planned Development of New Mines)**. Expansions at brownfield sites also have the potential for an additional +41 mtpa of capacity as detailed in **Table 4 (Planned Capacity Expansions at Existing or New Mines)**. Of the capacity in planning, there are a number of projects planned by non-traditional Pacific owners/operators seeking access to upstream fuel sources like Indian coke company Gujarat NRE, the Korean Resources Corp via Kores Australia and Idemitsu-Kosan.

In NSW almost all coal transportation – both to local consumers, as well as, the export facilities – is done via the Hunter Valley Coal Chain, the most significant coal chain in Australia presently transporting in excess of 95 mtpa to Newcastle Port Waratah Coal Terminal. This chain

incorporates 17 mine owners, 30 mines, 23 loading points with 80 different coal types and carries coal from over 350 km from the port with 85% of the customers based in Japan, Korea and Taiwan. Currently, the coal chain competes in NSW with passenger and freight for the use of the infrastructure, and these other businesses have priority. This has a major impact on export capacity and is unlikely to change in the near future. The rolling stock is operated by Pacific National and QR with a total of 29 coal train units; this allows around 21,500 trains per year to be hauled.

In the ARTC Master Plan for 2006 and addendum in 2008, many infrastructural improvements were identified to increase capacity including dedicated and duplicated rail tracks, upgrades to signalling and track turnouts, increasing siding lengths and axle loading capacities and above rail infrastructure requiring the correct train consists to be available to efficiently service the mines. The current total capacity of the rail system is approx. 113 mtpa with upgrades planned for 2009/10 that will have the major areas railings up to 165 mtpa in time for the new port facilities due in 2010. But as Table 5 reveals, rail infra-

Tab. 3 | Planned Development of New Mines

Country / Mine	Company / Operator	Mine Type	Mining Capacity				Committed New Capacity (where available)					
			Coking Coal	Semi-soft Coking Coal	Thermal Coal	Total	2008	2009	2010	2011	2012	2013
Abel	Donaldson Coal	U/G		2,0	1,2	3,2			1,1	1,8	2,2	2,3
Asnford	Eastern Corp (NEC)	U/G										
Awaba East	Centennial Coal	U/G		0,9		0,9					0,9	0,9
Bickham	Bloomfield Collieries	O/C			2,0	2,0		2,0	2,0			2,0
Boggabri	Idemitsu-Kosan	U/G			3,0	3,0						
Bylong	Anglo Coal Australia	U/G			0,0	0,0						
Caroona	BHP Billiton	O/C										
Cherry Tree Hill	Centennial Coal	O/C & U/G										
Clareval	Gloucester Coal	O/C	0,8			0,8						
Moolarben	Felix Resources	O/C			6,0	6,0		1,0	4,0	6,0	6,0	
Moolarben	Felix Resources	U/G			4,0	4,0			2,0	4,0	4,0	
Mt. Arthur Operations (MA-N/Bayswater)	BHP Billiton Energy Coal	U/G			5,0	5,0			2,5	5,0	5,0	
Mt. Pleasant	Rio Tinto Coal Australia	O/C		4,0	4,0	8,0						2,0
Mt. Sugarloaf	Tasman Coal	U/G			1,0	1,0						
NRE Wongawilli (Eluera)	Gujarat NRE Coke	U/G	2,1			2,1	0,8	0,9	2,1	2,1	2,1	
Oaklands North	Coalworks	O/C				3,0					1,0	3,0
Saddlers Creek (Denman)	Anglo Coal Australia JV	U/G	0,8			0,8		1,0	1,6	1,6	1,6	
Wallarrah # 2	Kores Australia	U/G				5,0			2,0	5,0	5,0	
Wallarrah Colliery	Kores Australia	U/G	4,0			1,0			1,0	2,0	3,0	
West Blue Wave	Whitehaven Coal Mining	O/C		0,0		0,0						
New South Wales			7.7	6.9	36.0	50.6	0.0	0.8	6.0	19.0	31.8	36.9
Alpha	Hancock Prospecting	O/C				30,0					5,0	10,0
Arcadia	Bandanna Coal	U/G										
Athena	Felix Resources	U/G										
Bee Creek	BHP Billiton	O/C										
Belvedere	VALE	U/G	7,0			7,0						
Broughton	Eastern Corporation	O/C										
Cameby Downs	Syntech Resources	O/C										
Capricorn	Macarthur Coal	O/C & U/G										
Caval Ridge	BHP Billiton Mitsubishi Alliance J.V.	O/C	5,5			5,5			2,0	4,0	5,5	
Codrilla	Macarthur Coal	O/C & U/G		3,2		3,2						
Collingwood	DJB Coal	O/C										
Diamond Creek	Diamond Creek Coal	O/C										
Dingo (North, Middle Creek, Trynina)	Cockatoo Coal	O/C										
Dingo - West	Bandanna Coal	O/C				0,8				0,3	0,8	0,8
Eagle Downs (Peak Downs - East) Stage 1	Aquila Res. / VALE	U/G	4,0			4,0						2,0
Elimatta	Northern Energy	O/C				5,0						2,5
Ellensfield	VALE	U/G		3,0		1,7						
Emerald	Northern Energy	U/G										
Foxleigh - N	MC2 Company	O/C										
Foxleigh - S	CAML Resources	O/C										
Galilee Coal Project	Waratah Coal	O/C & U/G				40,0						5,0
GlenLaurel	Xstrata Coal Australia	U/G										
Grosvenor	Anglo Coal Australia	U/G		6,5		6,5		3,0	4,5	4,5	4,5	
Guluguba	Cockatoo Coal	O/C				4,0				4,0	4,0	
Haystack Road	Tarong Energy	O/C										
Hillalong	Rocklands Richfield	O/C										
Horse Creek	Peabody Energy Australia	O/C										
Isaac River	BHP Billiton Mitsubishi Alliance J.V.	O/C										
Kemmis Walker	BHP Billiton	O/C										
Kerlong	Portman Mining	U/G	3,0			3,0						
Kestrel - W	Rio Tinto Coal Australia	O/C										
Kingover	Aquila Resources	O/C & U/G										
Lenton	New Hope	O/C										
Middlemount	Macarthur Coal	O/C & U/G	3,9	1,7		5,6		1,5	1,5	1,5		
Monto (stage 1)	Macarthur Coal	O/C				1,0		1,0	1,0	1,0		
Moorvale - West	Macarthur Coal	U/G		1,5		1,5	0,5	1,5	1,5	1,5	1,5	
Moranbah South	Anglo Coal Australia	U/G	6,0			6,0			2,0	4,0	6,0	
Mulgildie (Mono ?)	Macarthur Coal	U/G				1,5						
Oaklands	Coalworks	O/C				3,0						
Ownaview	DJB Coal	O/C										
Pentland	Xstrata Resources Australia	O/C										
Red Hills	Aquila Resources	U/G		1,0		1,0						
Rocklands	Rocklands Richfield	U/G										
Rywong	Chandall	O/C										
Saraji - East	BHP Billiton Mitsubishi Alliance J.V.	U/G										
Springsure Creek	Bandanna Coal	U/G										
Taroborah	Henan Shenhuo Group	O/C										
Togara - N	Xstrata Coal Australia	U/G				2,0			2,0	2,0	2,0	
Togara - S	BHP Billiton	U/G				4,0						
Valeria	Rio Tinto Coal Australia	O/C				5,0						
Vermont	Bowen Basin Coal	O/C		4,0		4,0						
Vermont East	Macarthur Coal	O/C & U/G										
Wandoan	Xstrata Coal Australia	O/C				12,0						3,0
Washpool	Aquila Resources	O/C	2,0			2,0						
West Burton	Macarthur Coal	O/C & U/G										
West Nebo	BHP Billiton	O/C										
West Walker	Macarthur Coal	U/G										
Wilunga	Macarthur Coal	O/C & U/G										
Winchester - South	Rio Tinto Coal Australia	O/C	2,4			1,6						
Wonbindi	Cockatoo Coal	O/C		2,3		1,7						
Woori (Stage 1)	Cockatoo Coal	O/C				2,0				2,0	2,0	
Woori (Stage 2)	Cockatoo Coal	O/C				1,5						1,5
Yamala (Emerald)	Northern Energy (NEC)	O/C										
Queensland			43.3	13.7	119.8	176.8	0.5	4.0	9.0	14.8	28.8	51.3
	Australia, of which	Open Cast & Underground	3,9	4,9	40,0	48,8	0,0	1,5	1,5	1,5	0,0	5,0
		Opencast	10,7	10,3	84,6	105,6	0,0	1,0	4,0	9,3	25,8	43,3
		Underground	<u>36.4</u>	<u>5.4</u>	<u>31.2</u>	<u>73.0</u>	<u>0.5</u>	<u>2.3</u>	<u>9.5</u>	<u>23.0</u>	<u>34.8</u>	<u>39.9</u>
		Total	51,0	20,6	155,8	227,4	0,5	4,8	15,0	33,8	60,6	88,2

Tab. 4 | Planned Capacity Expansions at Existing or New Mines

Country / Mine	Company / Operator	Mine Type	Mining Capacity				Committed New Capacity (where available)							
			Coking Coal	Semi- soft Coking Coal	Thermal Coal	Total	2008	2009	2010	2011	2012	2013		
Austar (Southland)	Yancoal Australia	U/G		0,3	0,4	0,7								
Bengalla	Rio Tinto Coal Australia	O/C			2,1	2,1								
Boggabri	Muswellbrook Coal	O/C		1,0	1,0	2,0		2,0	2,0	2,0	2,0	2,0	2,0	
Drayton	Anglo Coal Australia	O/C			2,5	2,5			0,3	0,3	1,5	1,5		
Duralie	Gloucester Coal	O/C	0,4			0,4		0,4						
Hunter Valley Operations	Rio Tinto Coal Australia	O/C		1,8	7,4	9,2								
Mandalong	Centennial Coal	U/G			0,8	0,8								
Metropolitan	Peabody Energy Australia	U/G		1,3		1,3								
Moolarben	Felix Resources	O/C			3,0	3,0								
Mt. Arthur Operations (MA-N/Bayswater)	BHP Billiton Energy Coal	O/C			3,7	3,7					3,7	3,7	3,7	
Narrabri North Stage II	Whitehaven Coal Mining	U/G			3,5	3,5			0,5	0,5	2,0	3,5		
NRE # 1 (Bellambi West)	Gujarat NRE	U/G		1,5	0,8	2,3					2,0	2,0		
Oaklands North	Coalworks	O/C			3,0	3,0								
Wambo	Peabody Energy Australia	O/C		1,5	4,5	6,0								
Westcliff	BHP Billiton Illwara Coal	U/G		0,7		0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	
New South Wales			1,7	6,8	32,7	41,2	0,7	3,1	3,9	7,6	12,3	13,8		
Baralaba	Cockatoo Coal	O/C			0,3	0,3								
Belvedere	VALE	U/G	2,0			2,0								
Broadlea-North	Vale	U/G	3,3			3,6								
Clermont	Rio Tinto Coal Australia	O/C			2,8	2,8								
Cook	Caledon Resources	U/G	0,5		0,5	1,0	1,0	1,0	1,0	1,0	1,0	1,0		
Curragh	Curragh Queensland Mining	O/C	1,5			1,5								
Curragh-North	Curragh Queensland Mining	O/C	1,0			1,0								
Dawson South (Theodore North)	Anglo Coal Australia	O/C	2,1		2,9	5,0			2,5	5,0	5,0	5,0		
Eagle Downs (Peak Downs - East) Stage 2	Aquila Res. / VALE	U/G	3,0			3,0								
Ensham Central	Ensham Resources	U/G			8,0	8,0								
Goonnyella - Riverside	BHP Billiton Mitsubishi Alliance J.V.	O/C & U/G	8,0			8,0			1,0	2,0	4,0	5,3		
Hail Creek	Rio Tinto Coal Australia	O/C			2,0	2,0				2,0	2,0	2,0		
Isaac Plains (South)	AMCI Aquila Resources	U/G		0,6	0,6	1,2			1,2	1,2	1,2	1,2		
Kestrel (Gordonstone)	Rio Tinto Coal Australia	U/G	1,7			1,7					1,0	2,0		
Kogan Creek	CS Energy	O/C			9,0	9,0								
Lake Vermont (Vermont)	Queensland Coal Mine Mgt.	O/C	1,5	0,5		2,0								
Millenium	Peabody Energy Australia	O/C	4,7	0,8		5,5				1,0	3,0	4,0		
New Acland (Acland) - Stage 2	New Hope Corporation	O/C			3,3	3,3				1,3	2,0	3,3		
New Saraji	BHP Mitsui Coal	U/G	5,0			5,0								
Oaklands	Coalworks	O/C			3,0	3,0								
Peak Downs	BHP Billiton Mitsubishi Alliance J.V.	O/C	6,0			6,0								
Peak Downs (Caval Ridge)	BHP Billiton Mitsubishi Alliance J.V.	O/C	5,5			5,5								
Wollombi (Suttor Creek)	Xstrata Coal Australia (JV)	U/G	0,6			0,6								
Woori (Stage 2)	Cockatoo Coal	O/C			2,0	2,0								2,0
Yarrabee	Felix Resources	O/C		0,8		0,8								
Queensland			46,4	3,0	34,4	83,8	1,0	1,0	5,7	13,5	19,2	25,8		
	Open Cast & Underground		8,0	0,0	0,0	8,0	0,0	0,0	1,0	2,0	4,0	5,3		
	Australia, of which		22,7	6,7	52,2	81,6	0,0	2,4	5,2	15,7	19,6	23,9		
	Underground		17,4	3,1	14,9	35,4	1,7	1,7	3,4	3,4	7,9	10,4		
	Total		48,1	9,8	67,1	125,0	1,7	4,1	9,6	21,1	31,5	39,6		

structure may achieve 165 mtpa close to the port but key areas will remain at below optimum levels of capacity. Nevertheless, the planned rail expansion projects are foreseen to eliminate some neuralgic bottlenecks more distant to Newcastle ports like the Nundah Bank 3rd track or upgrading the Drayton and Newdell Junctions in the short to mid-term.

Parallel to the ARTC Master Plan, the Hunter Valley Coal Chain Logistics Team (HVCCLT) was started in 2004 to improve the integrated management of the Hunter

Valley coal chain. All operations, maintenance activities, scheduling and coordination is handled by this team which have led to over 15% of coal volume improvements and will continue to be an integral part of the chain operations. e.g. monthly railings in late 2008 and January 2009 (8.2 mt) showed marked improvements.

The major NSW export coal terminal at Newcastle is currently undergoing a further expansion (Table 5). Port Waratah Coal Services (PWCS), the open access port, is increasing capacity at its Koora-

gang facility to 120 mtpa and a privately leased coal terminal Newcastle Coal Infrastructure Group (NCIG) will be operating at 30 mtpa capacity by 2009/10, with the potential to expand to 66 mtpa by +2015. The current port shipping channel capacity is in excess of 300 mtpa and will be operating with six loading berths by 2010 and eight berths by 2012.

The South Coast Coal Chain exports coal from the area south of Sydney and also the Western districts of NSW via Port Kembla Coal Terminal in Wollongong,

Tab. 5 | Estimated capacity development of NSW Coal Supply Chain until 2015

		2008	2009	2010	2011	2012	2013	2014	2015
Rail Capacity	Port to Allendale	165	165	165	165	165	165	165	165
	Allandale/Branxton Signalling	140	140	165	165	165	165	165	165
	3rd Minimbah Track	102	102	165	165	165	165	165	165
	Nundah Bank 3rd Track	86	86	86	165	165	165	165	165
	Newdell Junction	90	90	120	120	120	120	120	120
	Drayton Junction	80	80	80	80	120	120	120	120
	Duplication to Muswellbrook	65	65	165	165	165	165	165	165
Port Capacity	<i>Southern</i> Point Kembla	15	15	15	15	15	15	15	15
	<i>Newcastle</i> Kooragang	77	88	88	88	88	120	120	120
	Carrington	25	25	25	25	25	25	25	25
	NCIG	-	-	30	30	30	45	45	66
	<i>Newcastle Total</i>	102	113	143	143	143	190	190	211
	Total	117	128	158	158	158	205	205	226
Export demand (ARTC Forecast)		102	120	120	146	146	146	146	159

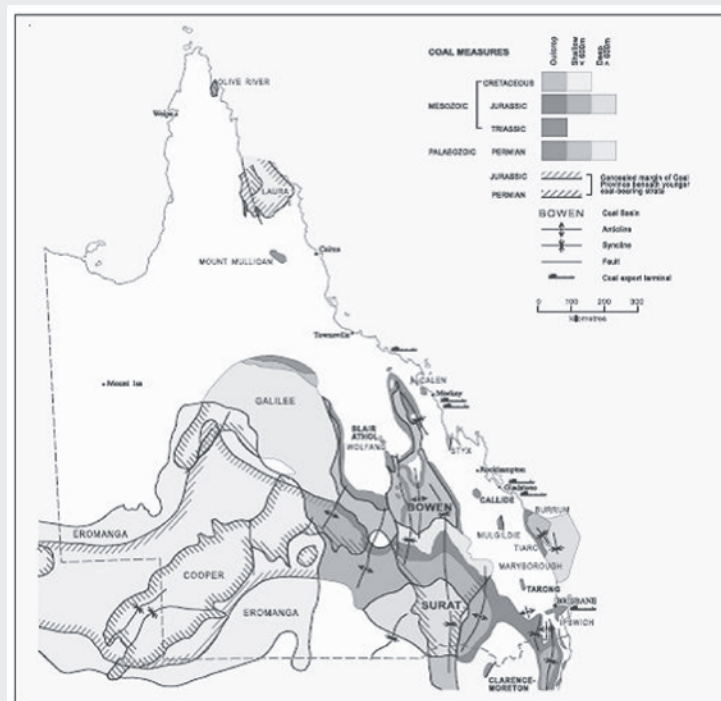
which is operated by BHP Billiton. Capacity is relatively low, and is not likely to increase substantially above today's 15 mtpa in the next five years.

Summing up, the NSW port of Newcastle is currently well positioned to handle future capacity increases. Port capacity can be further increased with a new coal terminal should the need be seen. With government support for upgrading rail to the Gunnedah Basin and a dedicated logistics team headed by ARTC's general manager today's mismatches between future rail and port capacities for thermal coal deliveries should be solved. ARTC is scheduled to release a Strategic Report in 2009 providing strategies and methods to upgrade the system to handle 250 mtpa of coal by 2018. Therefore the outlook for NSW is quite positive and the authors are convinced that the supply chain capacity can be increased significantly in coming years without major infrastructural bottlenecks hampering export.

Queensland

If global steel demand rebounds, the pace of export growth in the less populated state of Queensland (QLD) is expected to grow more quickly through 2014 than in NSW; mine and rail developments face fewer challenges and less restrictive planning procedures and shippers have more diverse rail and port infrastructure available. In 2008, the state produced approximately 187.9 mt of saleable coal of which

Fig. 5 | Overview of the Queensland Geological Coal Inventory



approximately 85% was destined for the seaborne export market. The bulk or 85% of the export coal is metallurgical qualities and destined into the very volatile global steel market, whose buyers rely on imported coking coals for pig iron production.

Within Queensland, currently only the Eastern part of the state has been geologi-

cally mapped and has the necessary rail infrastructure for transporting out coal. Figure 5 shows that the QLD coal basins currently extend >1,000 km from Brisbane in the South to Bowen in the North and vary from 100 to 350 km from the coast.

The key coal basins include:

- West Morton (Surat) (7 mtpa domestic / 7 mtpa export)
- Blackwater (60 mtpa export)
- Goonyella / Newlands (10 mtpa domestic / 124 mtpa export)

In Queensland, the current estimated mining export capacity is currently near 210 mtpa with approximately 65% coking coal, 9 % semi-soft/PCI and 26% thermal coal qualities. The mining capacity is up only marginally by 3% over estimates for 2007. According to ABARE, the new mines recently commissioned in the last 12 months include the Lake Lindsay mine (4.0 mtpa capacity) and the Vermont mine (4.0 mtpa capacity). Based on news reports, some mines are scheduled to close in 2009 with approximately 3 mtpa of capacity. These include Anglo Coal’s Dawson North, Anglo Coal’s Aquila at German Creek (now on care and maintenance), Oaky No 1 (on care and maintenance) and the New Oakleigh mine operated by the New Hope Corporation.

Based on last year’s exports of 159 mn t, the capacity utilisation of available export mines was near 76% or the same level as in 2007. This indicates that there is currently no bottleneck for mine level capacity. The sharp drop in global coking coal prices since late in 2008 due to falling demand has actually led to production cuts at a number of the Queensland coking coal mines for 2009.

New capacity from a number of new greenfield mining projects and brownfield mine expansions is expected to add almost +50 mtpa of mining capacity to the state between 2008 and 2014 far outstripping the planned closures. In QLD, seven new mining projects with committed resources will add +29.4 mtpa of new mine capacity in the next five years. The additional capacity includes 50% thermal base, far higher than the traditional export mix from the state. In Table 2, an overview of the +20.5 mtpa of total capacity by mine to be added in expansions projects at existing mines or at mines currently under construction including almost 4 mtpa at

Carborough Downs and 6.4 mtpa at the Ensham/Yongala mines.

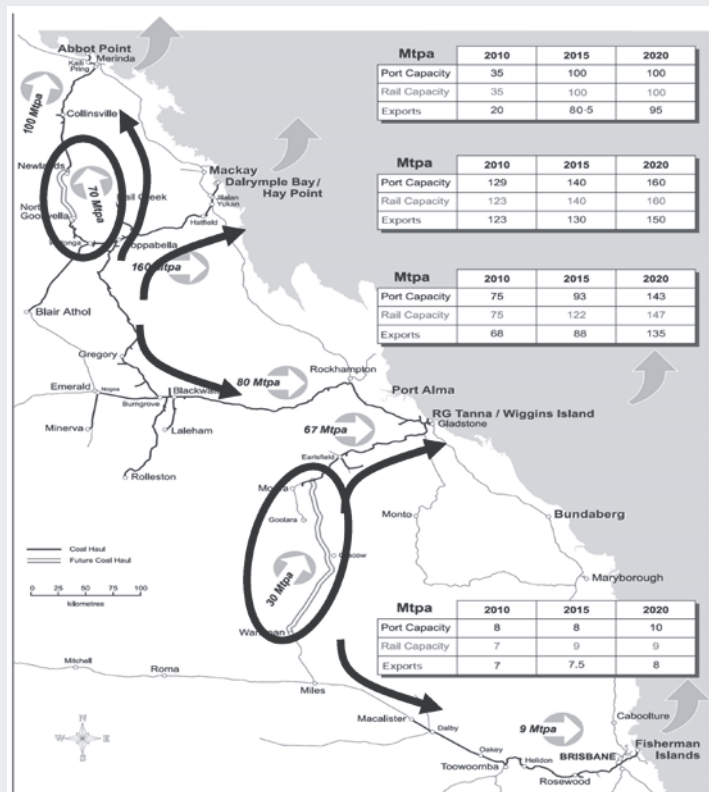
Queensland is home to an even larger number of mining projects for potential capacity additions in the mid- to long-term with over 60+ new mine projects and 20+ expansions currently in a planning stage. New planned mines could add an additional 175+ mtpa of additional export capacity if the corresponding rail and port infrastructure is added as shown in Table 3. A key area for new large mining operations is in the Galilee Basin, where Waratah Coal plans a 40 mtpa thermal mine with the first production set for 2013 and Hancock Prospecting has the Alpha mine project with 30 mtpa. Further developments in the Surat Basin, with high quality thermal coal prospects, are dependent highly on the timing and completion of the Southern Missing link between Wandoan and Banana which could open up exports from as many as 20 coal mines in the future. Mine expansions could also add almost +84 mtpa of capacity as detailed in Table 4, although many of the projects fail to provide clear planning milestones and may be delayed until financing costs fall and international coking coal prices recover.

Unlike NSW, there the Queensland coal chain with total capacity is approx. 185 mtpa is far more complex with four rail systems serving currently seven port facilities (Figure 6). Coal volumes on the Goonyella system (110 mtpa) and the Blackwater System (65 mtpa) are by far the largest capacity, with Newlands and Western contributing 12 mtpa and 7 mtpa respectively. Currently, approx. 20 mtpa of domestic coal is transported to power stations and utilities, mostly close to the coast.

The primary haulage company is Queensland Rail (QR) for below rail infrastructure and Queensland National (QR National) for above rail infrastructure, however Pacific National (Asciano) has contracts from BMA and Rio Tinto to haul coal from late 2009. Current capacity on the Goonyella and Blackwater systems is fully utilised and further increases in capacity will require investment in infrastructure supported by ‘take or pay’ contracts with specified guaranteed long-term transport volumes.

Massive investment in infrastructure are planned for the next five years with over A\$20 billion allocated, managed by the Federal Government infrastructure com-

Fig. 6 | Current QLD coal supply chain and major upgrades until 2020



Tab. 6 | Estimated capacity development of QLD Coal Supply Chain until 2015

		2008	2009	2010	2011	2012	2013	2014	2015
Rail Capacity	West Morton Rail	6	6	7	7	7	7	7	7
	Blackwater Rail	75	75	75	75	100	114	114	122
	Moura Rail	13	13	15	16	19	19	19	19
	Surat Southern Missing Link Rail	-	-	-	-	-	20	20	20
	Goonyella Rail	123	123	123	123	123	123	123	140
	Newlands Rail + Northern Missing Link	16	16	16	50	75	75	100	100
	Other/Galilee Basin	-	-	-	40	40	40	40	40
Total		234	234	236	311	364	398	423	449
Port Capacity	<i>Brisbane</i> Fishermans Island	5	8	8	8	8	8	8	8
	RG Tanna	68	68	68	68	68	68	68	68
	Barney Point	7	7	7	7	7	7	7	7
	<i>Gladstone</i> Wiggins Island	-	-	-	-	25	25	25	25
	Pt Alma /Rockhampton	-	-	10	20	30	40	40	40
	<i>Mackay</i> Hay Point	44	44	44	55	55	55	55	55
	DBCT	68	85	85	85	85	85	85	85
	<i>Bowen</i> Abbot Point	21	25	35	50	75	75	100	100
Total		218	245	265	301	361	371	396	396
Delta (Rail Capacity - Port Capacity)		16	-11	-29	10	3	27	27	53

mittee, for social and community structures, a national broadband network and road, rail port developments. Table 6 summarizes the estimated development of QLD coal supply chain until 2015 clearly stating that short term bottlenecks on the rail system will be overcome in mid term.

Western Coal Chain is a small capacity system railing coal to the Fisherman's Island Coal Terminal in the Port of Brisbane. The system could see export growth up to 13 mtpa by 2025, but the increases in non-coal passenger and freight services in the Brisbane suburbs and lack of dedicated below rail infrastructure limits the system capacity.

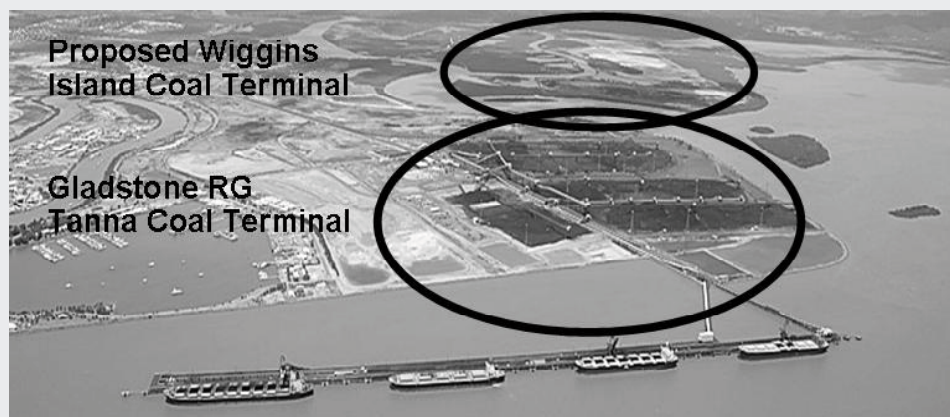
Blackwater and Moura Coal Chain transports coal to the Gladstone area. The coal chain is unlikely to increase capacity beyond 75 mtpa until Wiggins Island Coal Terminal (WICT) is commissioned. Forecasts with WICT operating and with the development of the Surat basin mines and the Southern Missing Rail link could see 100 mtpa by 2012 and even 150 mtpa by 2020. The current status is that planning has been completed, and should the link be commissioned, up to 26 mtpa could be shipped to Gladstone with estimated costs of A\$16-19 per tonne – some 50% above current average costs. The earliest coal could be delivered along this link is 2012,

and recent announcements have stated that trains could run on the Surat Rail system by 2013.

Gladstone Port Authority owns and operates – for the Queensland Government – the Port of Gladstone the two coal terminals of RG Tanna and Barney Point (Figure 7). The port has the disadvantage of being further from the major coal mine centres, which may affect the development of the system in the short term as an additional A\$3-4 per tonne have to be paid if coal is shipped from the Goonyella system mines.

The Goonyella Coal Chain is the largest coal chain in Queensland and hauls coal

Fig. 7 | Port of Gladstone major coal terminals



from the Goonyella, Moranbah, Dysart and Tieri areas to the port of Hay Point. In 2008, the system was operating under design capacity due to port and rail upgrades which caused extensive ship queues off the port. Rail system expansions include new rolling stock, upgrades to Jilalan rail yard and port loading facilities, which will increase capacity to 123 mtpa by the end of 2009, and duplications another 20 mtpa by 2015.

Hay Point Coal Terminal itself with the combined ports of Hay Point and Dalrymple Bay close to Mackay is today the largest export port in Australia. The former is owned and operated by BHP Mitsubishi Alliance and exports up to 44 mtpa of coking coal from the BMA mines. Plans for expansions are possible up to 55 mtpa. Dalrymple Bay is an open access port and is leased by the Queensland Government to Babcock and Brown Infrastructure. Expansion plans are currently in place for 85 mtpa.

Dudgeon Point just north of the Hay Point CT is a site for a potential new port related to the development of the Galilee Basin coal mines (possibly Hancock Prospecting at Alpha Mine), which would require major upgrades to the existing Goonyella Coal Chain. It should be noted here that the thermal coals of the Galilee Basin at e.g. the Alpha project are currently being investigated but distances of over 400 km to Abbot Point or to Dudgeon Point mean transport costs will be approximately A\$17 per tonne or 50% above current costing. All developments are conceptual at this stage, but a recent announcement by Waratah Coal has stated that they will ship 40 mtpa to Abbot Point once the Northern Missing Link is constructed, but they will build their own dedicated Standard gauge line, a project supported by the Chinese.

Newlands Coal Chain is the most northerly coal chain connecting the Newlands area mines to Abbot Point Port. The planned major increases in the Abbot Point Port capacity to 50 mtpa (currently 25 mtpa) and later to 100 mtpa are closely associated to the proposed construction of the Northern Missing Link (NML). This planned 76 km rail would link by 2011/2012 the Goonyella rail system to the Newlands rail system allowing for substantial flexibility to the coal chains.

Overall, rail capacity is relatively well matched to port tonnages and may reflect the more vertically integrated approach in

Queensland where the State Government owns the rail and most of the port infrastructure. Besides, rail capacity planning is more easily managed compared to NSW due to the negligible commuter and freight traffic utilising the coal chain system. Planning for expansion has been completed and fully analysed and is only waiting for mine owners to support the expansions by underwriting capacity increases. If completed on time, the total rail capacity could equal 272 mtpa in 2010, 364 mtpa in 2012 or near port capacity levels. Major port capacity increases include: the new Wiggins Island terminal (+25 mtpa from 2012), and an expansion at Abbot Point (+25 mtpa in 2012 & + 25 mtpa 2015). Still the project lag time could be up to three years. Additionally, Queensland faces shortages in rolling stock upgrades which could limit capacity to 250 mtpa through 2011.

Impact of recent developments and challenges for Australian Mining Sector

During the past months, the export industry has suffered large reductions in coking coal exports due to the sharp decline in demand from Asian economies and the global steel market. This decline has allowed the Australian Mining Industry to take a breath and determine its future requirements and the timing of infrastructure development. The over capacity demands on the Goonyella system have reduced and the frantic rush to develop new infrastructure can now be controlled to provide a future East Coast system that matches the world's requirements, without the need to build infrastructure during peak export periods. The emphasis has now returned to the state governments instead of mining companies to look to the future and develop a more robust system underwritten by a stronger industry that understands the export requirements and can manage the costs of development with more certainty.

An example for the increased weight of the state is the announcement of the federal Australian government to inject a A\$1 bn stimulus program into the coal supply chain. ARTC was entitled in December 2009 to bring forward a number of projects to upgrade the Hunter Valley coal chain under the "nation building" package. E.g. the 11 km^{3rd} track between Maitland and

Newcastle port and the 2km rail passing look at Bylong between Gulong and Denman are part of the fast tracked NSW infrastructure projects.

In addition to global financing and the capacity bottlenecks, the Australian mining industry could face additional costs and constraints to capacity as industrial emissions are addressed under Australia's emissions trading legislation. The potential impacts of the proposed Carbon Pollution Reduction Scheme (CPRS) on the mining sector were reviewed in an independent analysis done by the ACIL Tasmin, but commissioned by the Australian Coal Association, and released this May. The study conducted an independent survey of the major mines and found that 57% of Australian coal production is currently from mines that emit more than the allowed 1,000 mt of CO² per \$ mn (AUS) of revenue (EITE eligibility). The study concludes that the CPRS could lead to the closure of up to 16 mines and the loss of up to 22 mn t of annual production within the first 10 years. The CPRS, which includes an emissions trading scheme, supposed to come into effect in 2010, was delayed until July 2011.

All the same, the analysis of the transportation capacity of shows that critical bottlenecks in coal supply chain in both Queensland and New South Wales could be resolved; though at the earliest by 2012, with the key area of concern being the rail capacity. Port capacity congestion should be alleviated in 2008/2009 with port capacity in both states sufficient to meet export demand after the expansions of Dalrymple Bay and Abbot Point (QLD) are complete. Port capacity expansions will continue through 2015, which may see total port capacity rising from 325 mtpa in 2008 to 448 mtpa in 2010 and to 544 mtpa in 2012.

Investments into Australia's mining sector will help it maintain its status as a cornerstone supplier in the international seaborne hard coal market for both thermal and metallurgical qualities. In the International Energy Agency's Reference Scenario in the World Energy Outlook, total global coal demand is expected to rise by 2% annually through 2030 with the strongest growth in Asia at +3.1% led by China (+3.0%) and India (4.1%). Over the same period, regional international trade is also expected to rise from 613 mtpa in 2006 to 979 mtpa in 2030 with the largest growth in the Pacific Rim. This strong de-

mand growth can not be met in the mid-term from domestic sources, forcing buyers into the export market like the Chinese to meet short-run demand or to optimize pricing conditions as well as the Indians to cover demand from their expanding coal-fired capacity. For these countries and others, Australia will remain a key source of thermal coal with investments in mines, rail and ports providing a secure outlet for mid-term planning needs.

Global demand for coking coal exports is cyclical and moves with the cyclical global demand for steel and steel pricing. The volatility of this market is seen in the annual change in volumes for seaborne coking coal exports in the last 10 years with annual booms as high as +10% 2006 and contractions of -5% in 2001. Australia has remained the largest exporter of metallurgical coal. Its mining companies remain flexible by quickly adjusting export volumes at the individual mine levels to fit global pricing fundamentals except under circumstances of force majeure. With as much as 120 mtpa of potential coking coal capacity available at new mines or expansions under construction or in planning and as much +43 mtpa in PCI qualities plus the infrastructure projects outlined earlier in the paper underway, it is a clear sign that Australia will remain the main supplier of metallurgical coal in the global market adding capacity volumes as the steel markets recovers.

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2. China Coal Report, Barlow Jonker, Sydney
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