

The ADANI Group

Remote Prospects

A financial analysis of Adani's coal gamble
in Australia's Galilee Basin

“ The sector is facing a number of very strong headwinds. The list includes sharply increasing costs, weaker markets, declining productivity, prices falling from historic highs and a strong local currency. ”

*Harry Kenyon-Slaney,
CEO of Rio Tinto Energy Groupⁱ
November 2013*



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Prior to this, Tim was Managing Director, Deputy then Head of Australasian Equity Research at Citigroup from 1998 to 2007. Tim was on the Citigroup Australasian Commitments Committee for five years to 2007 overseeing financial market transactions and underwritings. Tim was a top rated industrial analyst first with Macquarie Equities (1988-91) then County NatWest Securities (1992-96) in Australia, covering the leading industrial conglomerates as well as enjoying a specialisation in the forestry, brewing and wine sectors. Tim then moved to Singapore to cover the Asian equity market during 1996-1998 with Deutsche Bank, just in time to experience the Asian Financial Crisis!

Tim has authored a number of financial clean energy articles that have been published over 2011-2012 in RenewEconomy.com and Climate Spectator, Australia's two leading online renewable industry websites. Tim is working as a financial analyst consultant in the areas relating to the move to a low carbon economy, including fossil fuel and related infrastructure assets at risk of being stranded in this process.

TOM SANZILLO

Tom joined the Institute for Energy Economics and Financial Analysis (IEEFA) as Director of Finance in 2012. In conjunction with Tim, Tom authored *"Stranded: A Financial Analysis of GVK's Proposed Alpha Coal Project in Australia's Galilee Basin."*ⁱⁱⁱ

Since 2007 Tom has run his own company TR Rose Associates. The company has served clients working to create alternatives to fossil fuel use in America. The work has consisted of research, reports, testimony and advice on construction costs of coal plants and alternatives, financial reviews (involving independently owned utilities, cooperatives, public authorities and hybrid organisational structures), credit analysis, coal market and price analyses, rate impact assessments, federal financing, federal coal leases, coal export markets and policy, load forecast reviews, energy contracts and a series of other topics related to electricity generation. He has served as a financial advisor to the innovative Green Jobs/Green New York large scale residential energy efficiency retrofit program in New York State. Tom has served on the Advisory Board on the future management of the Long Island Power Authority in New York State. His clients also have included business, labor and community organisations covering a host of public and private finance and policy issues.

From 1990 to 2007, Tom served in senior management positions to the publicly elected Chief Financial Officers of New York. From 2003 to 2007, he served as the First Deputy Comptroller for the State of New York. Tom was responsible for a US\$150bn globally invested public pension fund; oversight of state and 1600 units of local government budgets and public debt offerings; audit programs for all state agencies, public authorities (including power generation authorities) and local governments, and review and approval of state contracts. One estimate places the level of public assets under the State Comptroller's watch at over \$700bn. Due to an early resignation of the elected State Comptroller, Tom, as First Deputy Comptroller, served for a short period as the New York State Comptroller from 2006-07. His most recent publication on New York State government and finance is part of the 2012 Oxford Handbook of New York State Government and Finance.

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Executive Summary

The Adani Group is a large Indian conglomerate controlled by the Adani family. The family operates a number of private businesses and owns a controlling stake in the listed Adani Enterprises Ltd (Adani Enterprises). Adani Enterprises, in turn, has controlling interests in two listed entities – Adani Ports & Special Economic Zone Ltd (Adani Ports) and Adani Power Ltd (Adani Power).

Adani Enterprises is proposing to develop an at peak 60 million tonne per annum (Mtpa) thermal coal mine complex in the remote Galilee Coal Basin, 160 kilometres (km) north-west of the town of Clermont, central Queensland, Australia. Coal produced would be transported by a greenfield rail line to Abbot Point Port, where the company proposes a new 70Mtpa coal terminal (T0) in addition to an existing terminal (T1) for which it has a 99-year lease. Adani Enterprises anticipates selling much of the coal in India to support the nation's plan to expand the use of coal-fired generation for its electricity grid.

We view this US\$7 billion (bn) proposal – the Carmichael Mine and Rail project (the Carmichael project) – as uncommercial for investors. The project's economics don't stack up. The short- and long-term price of coal globally, and within the principal outtake market of India, does not support the cost structure of this mining project. The Adani Group is also financially and operationally constrained and faces a series of logistical barriers in Australia.

Key issues include:

The Carmichael project is uneconomic – a high cost coal product in a low priced coal market with an uncertain future.

- **Carmichael coal is a low quality, high cost product challenged by low market prices:** Carmichael has a high strip ratio (16t:t) and the coal quality is low by Australian standards (20-30% ash and energy content of 5,260kcal net as received (NAR)). Open cut mining to 280 metres is significantly deeper than required in the south of the Galilee Coal Basin. We estimate an energy-adjusted cash cost of production of A\$87/t (US\$84/t, inclusive of royalties, free on board (FOB)).
- **Carmichael's coal cost structure is likely to remain above the global thermal coal price for the foreseeable future:** Should the Carmichael project proceed, it will have to build all the required greenfield rail, power and water infrastructure. Once complete, such infrastructure could facilitate the development of up to eight other massive thermal coal mines in the Galilee Basin. An additional 313Mtpa of thermal coal for export

would flood the global seaborne thermal coal market (equal to a 30% increase in global supply) and ensure it remains in oversupply at a time when global demand and price forecasts indicate structural decline. A 'successful' commissioning of the Carmichael project would be likely to ensure the global thermal coal price remains below our forecast of Carmichael's cash cost of production.

- **India's power market is fatally flawed. It cannot absorb the high price of coal from the Carmichael project:** One stated objective of the Carmichael project is to supply thermal coal into the Indian power market. The domestic price of coal in India is in the US\$30/t range and the price Carmichael coal requires is over US\$95/t (inclusive of shipping). Successful sales to India of Carmichael coal will place a substantial pressure on power generator profits and the price of electricity in India. We see this as a flawed strategy, given conflicting currency, fiscal and balance of trade dynamics in India.
- Furthermore, fundamental policy shifts in China's energy and economic growth initiatives suggest greater reliance on renewables and less support for costly and environmentally unsound coal generation projects. Reduced Chinese imports from the seaborne market will further depress coal prices and ensure underutilised mine capacity.

The Adani Group is a weak partner for this expensive coal, rail and mine project in Australia. In the last several years the enterprise has announced an overly ambitious expansion plan, lost share value in critical segments and is overleveraged.

- **The Adani Enterprises' external equity market capitalisation is US\$5.17bn against estimated Carmichael project costs of US\$7bn:** While Adani Enterprises has reported a combined equity market capitalisation of the group of US\$30bn, we estimate total group market capitalisation is actually US\$5.17bn (including minority equity). Despite this weak capitalisation, Adani Enterprises has announced an enormous list of new capital intensive ventures.
- **The Adani Group is highly geared:** Against an external market capitalisation of US\$5.17bn, The Adani Group has an estimated US\$12bn of net debt, a significant portion of which is US\$-denominated with limited hedging. Adani Power is of particular concern, being loss-making with net debt over 300% of its current market capitalisation.

Executive Summary (continued)

- **Adani Abbot Point Coal Terminal (AAPCT) now represents US\$2bn of “off-balance” sheet group debt:** The Adani Ports’ transfer of AAPCT to the Adani family’s private group in March 2013 takes off the balance sheet the estimated US\$1.95bn of debt in AAPCT. The transfer also moved the ownership of AAPCT to a non-Indian domiciled entity.
- **Adani Power is financially weak and operationally underperforming:** Adani Power’s share price is down 46% year-to-date and down 74% over three years – a massive underperformance relative to the MSCI India Index (“INP”). Adani Enterprises is down 39% year-to-date and down 70% over three years. The inability to source domestic coal supplies has left Adani Power with power purchase agreements in rupees and an increasing proportion of imported coal input costs denominated in US dollars.
- **Adani Enterprises does not have a long or successful history of coal mining:** Adani Enterprises has mined 2-4Mtpa in Indonesia over 2010-2013, its first experience in coal mining. Adani Enterprises is now proposing to build the biggest coal mine complex in Australian history.
- **Adani Ports acquired AAPCT at the top of the cycle:** The port is operating at 40% of stated capacity. In 2012/13 revenues were at US\$195m. The Adani family paid a purchase price (equity plus debt) of US\$2.2bn, a price equal to 11.5x annual revenues. The gross cashflow yield of AAPCT in 2012/13 was 5.6%, insufficient to cover even the interest costs.

The Adani Group faces a series of logistical and operational hurdles that have caused delay and threaten to push the current estimated price of US\$7bn upward.

- **The Adani Group has suffered a series of delays to its Australian mining, rail and port plans:** Adani Enterprises initially expected to have the Carmichael project selling coal by 2014. Adani Enterprises concedes this timetable has been pushed out to 2016, but we think 2017 at the earliest is more likely with full production beyond 2022. Any delays would continue to squeeze the Adani Group’s cashflow.
- **Carmichael coal is in a very remote location:** Carmichael is 400km from the coast and there is no rail infrastructure within 200km. There is also no commercial power or water infrastructure within 200km and there is no sealed road access for 90km.

Section 1

Introduction: Carmichael Coal Mine and Rail Project

Adani Enterprises purchased the Galilee coal tenement Exploration Permit for Coal (EPC) 1690 from Linc Energy Ltd, an Australian Stock Exchange (ASX)-listed fossil fuel development company in August 2010 and EPC 1080 from Mineralogy Pty Ltd for A\$25m a year later. Adani Enterprises paid Linc Energy A\$500m in cash, plus agreed to provide a A\$2/tonne coal royalty (indexed to inflation) on all production for the first twenty years.ⁱⁱⁱ

The Carmichael project comprises two major components:

1. A greenfield coal mine (over EPC 1690 and EPC 1080), being both open cut and underground mining, and associated mine processing facilities; and
2. A railway line for the transportation of coal to export facilities at either, or both, the Port of Abbot Point (AAPCT) or the Port of Hay Point (Dudgeon Point).

The proposed mine is expected to produce 60Mtpa of thermal coal during its first 20 years of full production (2020-2039) based on a forecast run-of-mine (ROM)-to-saleable coal yield in this period of 81%. Over the proposed 60 year life the project will deliver a forecast average 40Mtpa of saleable coal at a yield of 79%. Export coal from this project is aimed to predominantly service the Indian market, both to Adani Power and other power companies.

The coal deposit lease is primarily under the Moray Downs cattle station, 160 km north-west of the town of Clermont in central Queensland. Adani Enterprises acquired this rural property for a reported A\$110m in February 2012.^{iv}

Options for the routing of a rail corridor to either of the ports at Abbot Point or Hay Point include:

1. Option 1 – from mine site 118km east to the proposed standard gauge Alpha Railway and then 325km north-east to Abbot Point Port (this would utilise some of the 495km greenfield rail proposal currently being proposed by GVK Power's Hancock Coal project);
2. Option 2 – from the mine site 190km to the existing narrow gauge Goonyella system (the "East-West" proposal), connecting 15km south of Moranbah; and
3. Option 3 – from the mine site 70km east and then 300km north to the Port of Abbot Point via a standard gauge greenfield railway ("the North Galilee Basin Rail project").

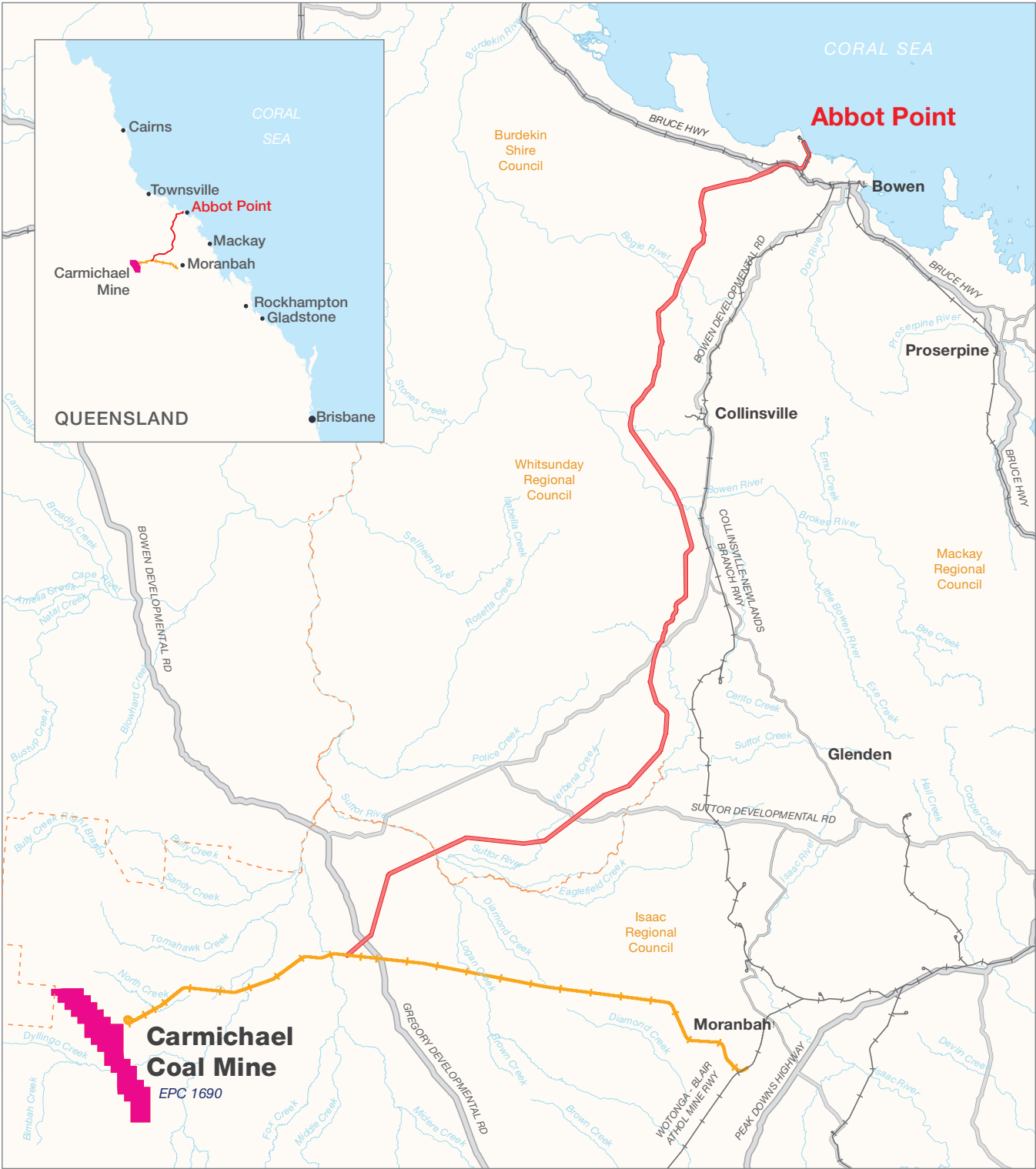
In addition, depending upon the rail option, two port options are under consideration for the Carmichael project:

1. Option 1 – Export via the Port of Abbot Point; and/or
2. Option 2 – Export via the Dudgeon Point expansion at the Port of Hay Point.

Section 1

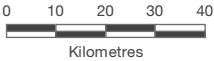
Introduction: Carmichael Coal Mine and Rail Project (Continued)

Map of Carmichael and Queensland



LEGEND

- | | | | |
|------------------|-------------------------|--------------------------------------|----------------------------|
| — Highway | Local Government Area | Major Watercourse | — Existing Railway |
| — Secondary Road | Coal Exploration Permit | NGBR 1km Investigative Rail Corridor | — Carmichael Rail Proposal |
| — Minor Road | | | |



Section 2

Galilee Coal Basin: Background, Challenges and Opportunities

2.1 Galilee Coal Basin

The Galilee Basin in central western Queensland is a vast untapped source of predominantly thermal coal estimated to contain tens of billions of tonnes of resource.

The lower than benchmark energy content, high ash, high strip ratios, distance to ports and significant levels of overburden all undermine project economics and explain why no Australian mining firm has ever developed a project here.

“The Galilee Basin is located 200km to the west of the Bowen Basin and contains large deposits of high-volatile, low sulphur thermal coal. The remote location and a corresponding lack of supporting regional infrastructure including water, power and historic low thermal coal prices have continued to make development of the Galilee Basin sub economic.”

Bede Boyle, December 2010^v

Despite these economic challenges a series of new mine projects have moved into the planning stages, initially buoyed by the recent period of record high coal prices. Figure 1 details the major project proposals across the Galilee Basin, the stated size and capital cost and proponents. A number of these projects have been in planning and approval stages for a number of years. However, the magnitude of financial capital and infrastructure required, coupled with a depressed thermal coal market outlook make opening up the Galilee basin a challenging and high risk proposition.

To add 313Mtpa of new supply to the global seaborne thermal coal market (828Mt in 2012) would represent a greater than 30% increase in global supply from this single basin. This is well in-excess of any medium term demand growth projections.

Projects continue to suffer delays and deferment. For example, the Brazilian mining giant, Vale S.A., having written down its Australian coal assets by US\$1bn in 2013, announced in July 2013 its plan to sell the Degulla thermal coal project in the Galilee Basin.^{vi} Other would-be Galilee developers such as GVK and Waratah Coal are considerably behind schedule.

Figure 1: The Galilee Coal Basin – Proposed Projects

Owner	Project	Type	Status	Targeted net coal output Mtpa	Capex (A\$bn)
Adani Group (India)	Carmichael Coal	Open cut & U/G	EIS active	60	7.1
GVK Coal (India)	Alpha	Open cut	BFS Complete	30	10.0
	Alpha West	Underground	PFS	24	
Waratah Coal P/L (Clive Palmer)	Kevin's Corner	Open cut & U/G	EIS complete	30	4.2
	China First	Open cut & U/G	EIS active	40	8.8
	Alpha North	Open cut & U/G	Pre-EIS	40	n.a.
AMCI Group & Bandanna Energy Ltd JV	South Galilee Coal	Open cut & U/G	EIS active	14	42
Macmines Austasia Pty Ltd ⁽¹⁾	China Stone	Open cut & U/G	EIS being prepared	45	n.a.
Vale SA (Brazil)	Degulla	Open cut & U/G	Pre-EIS, for sale	30	8.0
Galilee Basin - Total				313	42.3

(1) Owned by the private Chinese family business, the Meijin Energy Group.

Section 3

Adani Group: Background, Challenges and Opportunities

3.1 Conglomerate structure

The Adani Group was formed in 1988 and has grown rapidly to become one of the leading Indian family-controlled conglomerates across a multitude of businesses. The origin of this structure is based around the successful Mundra Port in the Indian state of Gujarat. Having built the largest private port in India from a standing start in only 25 years, the Group has expanded vertically and horizontally. The Group now operates in power generation and distribution, transportation and warehousing, property development, coal trading and more recently coal mining. Having facilitated the import and export of a number of commodities in India via Mundra Port, the Group then moved into trading and/or production of a number of these, as diverse as bulk grains, coal, shipping fuels and edible cooking oils.

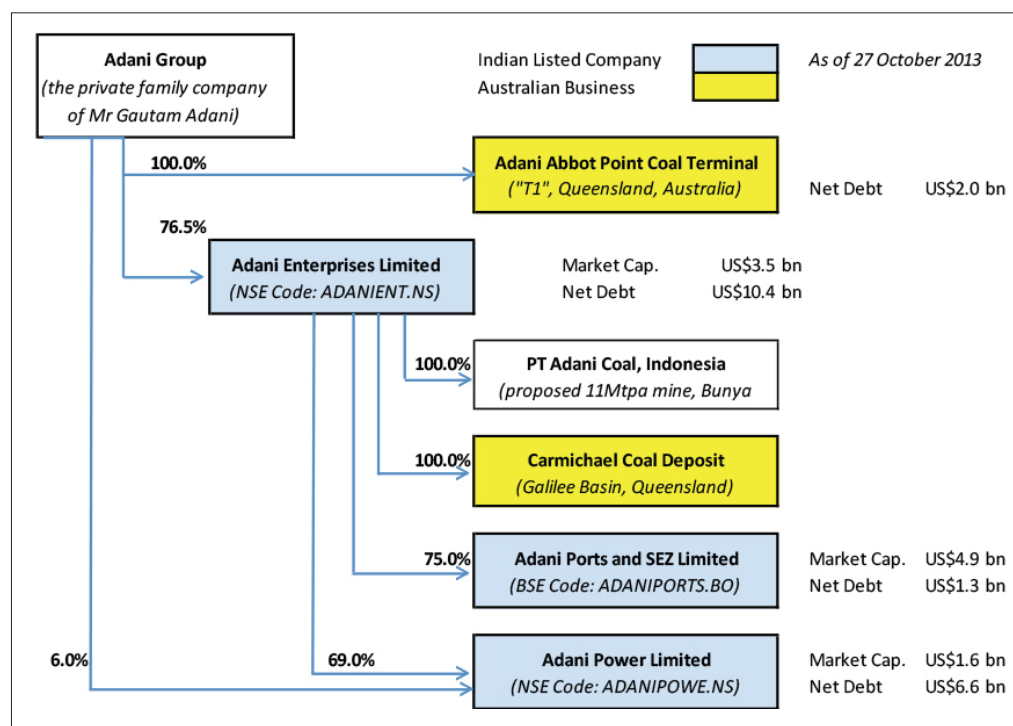
The Adani Group comprises a number of unlisted Adani family-owned businesses and majority ownership of three listed companies, which have a cascade ownership structure:

1. Adani Enterprises Limited;
2. Adani Ports & Special Economic Zones Limited; and
3. Adani Power Limited.

The Adani Group has a significant business presence in India across its operations. In 2012/13, the Adani Group was involved in trading 46Mt of coal, representing some 33% of India's total coal imports for the year. Adani Enterprises also produced 4Mt of thermal coal in Indonesia, operated 7,260 megawatts (MW) of coal-fired power generating assets in India and handled 91 million metric tonnes (MMT) of cargo across its three Indian ports.

In relation to the key business units discussed in this report, the private family group owns the Adani Abbot Point Coal Terminal (AAPCT) in Queensland, Australia (acquired from Adani Ports in March 2013). The Adani family also owns 76.5% of Adani Enterprises, which in turn owns a 75% stake in Adani Ports and a 69% interest in Adani Power (members of the Adani family own another 6% of Adani Power directly). Adani Enterprises owns the Adani Group's coal mining and trading interests, including the Carmichael deposit in Queensland, Australia – Figure 2.

Figure 2: The Adani Group Structure



Section 3

Adani Group: Background, Challenges and Opportunities (Continued)

The Adani Group ... substantially smaller than it appears

It is of concern that Adani Enterprises has made a number of representations as to its size as a justification for its extensive capex profile, stating it has a “market capitalisation of US\$30bn” and “projected investment of US\$25bn in the next five years”.^{vii}

The more subdued claim by Adani Enterprises that “the market capitalisation of the Adani Group was US\$12bn as at February 27, 2013”^{viii} is an overstatement of the combined group’s equity capitalisation. The inflated figures for the size of the Adani Group are based on the combined market capitalisations of the three Adani listed entities: Adani Enterprises, Adani Ports and Adani Power. This double counts the market capitalisation due to cross-shareholdings. The market value of the 75% share of equity owned in Adani Ports and 69% share of equity in Adani Power is implicitly already included in the market value of equity in Adani Enterprises, the listed holding company.

The total external market capitalisation has dropped 21% or US\$1.37bn since 27 February 2013 to now be US\$5.17bn – Figure 3.^{ix} The consolidated net external debt of the listed Adani Enterprises is US\$10.35bn, or over US\$12bn if the estimated net debt in AAPCT is included – refer Section 5.3.

As a consolidated group entity, Adani Enterprises’ US\$10.35bn of net debt already incorporates the US\$1.25bn of net debt in the majority owned Adani Ports and US\$6.55bn of debt in Adani Power. As such, saying the Adani Group’s total net debt is the sum of the three i.e. US\$18.15bn is also double counting, just as saying the group’s total market capitalisation is US\$9.89bn.

Consolidated group net debt is US\$10.35bn, and the total external market capitalisation of the three listed Adani firms is US\$5.17bn. This is substantially smaller than the various company claims of US\$30bn or US\$12bn.

Figure 3: Equity and Net Debt Capitalisation of the Adani Group (US\$bn)

US\$bn	Rs	Market Cap.	Cross-holding	External Market Cap.	Net Debt ^{(1) & (2)}
Adani Enterprises	Rs193.60	US\$3.46		US\$3.46	US\$10.35
Adani Ports	Rs144.35	US\$4.86	75.0%	US\$1.22	US\$1.25
Adani Power	Rs33.45	US\$1.56	69.0%	US\$0.48	US\$6.55
Total		US\$9.89		US\$5.17	US\$18.15

(1) Excludes the debt of ~US\$1.95bn attached to AAPCT and any other debt in the Adani family group of companies.

(2) Net debt is calculated using consensus forecast for 31 March 2014 so as to reflect the Adani Ports equity raising of Rs10bn (US\$180m) in June 2013 and Adani Power raising in May 2013 of Rs25bn (US\$456m).

Consensus forecasts accessed 27 October 2013 from Thomson Reuters Analytics.

3.2 Adani Enterprises

Adani Enterprises is the listed flagship of the Adani Group and listed in 1994 at Rs150 per share (ps). Adani Enterprises' key asset is a 75% stake in Adani Ports, with a secondary asset being a 69% shareholding in Adani Power. Adani Enterprises also operates the coal trading and mining businesses of the Adani Group. In 2012/13 Adani Enterprises' trading division imported 46Mt of coal into India. Adani Enterprises holds a 100% ownership of the Carmichael project in Australia. Adani Enterprises entered the coal mining business in 2008 with the purchase of a coal deposit in Bunyu, Indonesia.

Against a current market capitalisation of US\$3.46bn, Adani Enterprises had a consolidated group net debt of US\$10.35bn as of March 2013. The high level of financial gearing couples with Adani Enterprises' heavy investment in the underperforming Adani Power business, such that the share price is down 72% in absolute terms and down some 50% relative to the Bombay Stock Exchange (BSE) index in the last three years – Figure 4.

Figure 4: Share Price Performance – Adani Enterprises



Source: <http://au.finance.yahoo.com>

Adani Group: Background, Challenges and Opportunities (Continued)

3.3 Adani Power

Adani Power listed on the BSE in Aug 2009 at Rs100ps. The stock price has fallen 66% since then to Rs33.45ps, underperforming the BSE by almost 70% over the last four years – Figure 5. Adani Power did a selective equity raising in May 2013 at Rs53ps, supported by Adani Enterprises and the Adani family. This expanded issued capital by 20% and raised Rs25bn (US\$456m). The stock is down 30% since this latest raising. Adani Power's market capitalisation of equity is US\$1.56bn.

Adani Power's key business is coal-fired electricity generation, with 7,260 MW of operational capacity as at September 2013. The key unit is the fully operational 4,620 MW Mundra coal-fired power station in Gujarat. The second largest asset is the Tiroda coal-fired power station in Maharashtra with a design capacity of 3,300 MW, half of which is being commissioned in 2013/14. A third coal-fired facility at Kawai in Rajasthan of 1,320 MW is under construction. Adani Power also owns and operates four transmission lines of 2,923km in total.

Adani Power has grown rapidly from a standing start in 2009 – with the huge Mundra facility the company's first experience in power generation. The company has massively ambitious plans to grow from zero capacity in 2009 to 20,000 MW by 2020. However, Adani Power has been beset by operational and financial issues – with its plants operating at only 63% of capacity in 2012/13 and the firm's net debt blowing out to US\$6.55bn, some 400% of its current equity capitalisation (even after a massive equity raising in May 2013). A mismatch of rupee revenues and US\$ costs have decimated profit margins. We discuss these factors in Section 4.3.

Figure 5: Share Price Performance – Adani Power Since IPO



Source: <http://au.finance.yahoo.com>

Adani Group: Background, Challenges and Opportunities (Continued)

3.4 Adani Ports

Adani Ports is the strongest business within the Adani Group, with an equity market capitalisation of US\$4.86bn and a five year track record of outperforming the Bombay Stock Exchange (BSE) Index – Figure 6. Adani Ports floated in 2007.

The key asset of Adani Ports is the Mundra bulk, container and crude cargo port in Gujarat with a stated cargo capacity of 200Mtpa. Adani Ports built this port as a greenfield development, commissioning it in 2004. It has since been expanded to become the largest privately owned port in India. In 2012 Adani Ports commissioned two new facilities, the 100% owned 70Mtpa Hazira and the 74% owned 20Mtpa Dahej ports. In 2012/13 Adani Ports' total volume handled was reported at 91Mt (+38% year-on-year, "yoy"), giving a capacity utilisation rate of 55% - whereas most major ports on India's west coast are running at an average 100% utilisation. Mundra port is the second largest port in India.

Adani Ports has vertically integrated in India, building up operations in rail, trucking, pipelines and warehouses to distribute freight. Mundra Port provides coal importation for Adani Power's 4,620 MW Mundra power station and the Tata Group's 4,000 MW Mundra power station.

Adani Ports acquired a 99-year lease over the AAPCT T1 in Queensland, Australia, in May 2011 for A\$1.83bn (equivalent to Rs8,600 crore/US\$1.9bn at the time), but excessive financial leverage saw AAPCT transferred from Adani Ports to a private offshore unit of the Adani family in March 2013. This is the first and only port outside of India that Adani Ports has owned and operated. Three further ports in India at Mormugao (74% owned), Vizag (100% owned) and Kandla (51% owned) are under construction – refer Section 3.6.

Figure 6: Share Price Performance – Adani Ports



Source: <http://au.finance.yahoo.com>

3.5 A conglomerate structure ... now adding geographic and financial complexity

Since being formed in 1988, the Adani Group has been ambitious and relentless in its expansion plans, building a succession of greenfield developments across a myriad of somewhat related businesses spanning ports, railways, coal mining, coal-fired power generation, solar generation, electricity transmission, gas distribution, industrial special economic zones and agricultural commodities. This is a truly conglomerate group of businesses across India, with more recent international expansions in Indonesia (coal mining, 2008) and Australia (ports, coal and rail, since 2009).

While there are exceptions, in the view of the authors, many conglomerates have a history of underperforming their non-conglomerate peers due to their structural complexity and the resulting inability of senior management and the board to fully understand the multitude of business dynamics. A key factor is diversification – while bringing a natural hedge of different business cycles, it more critically brings an operational, managerial, financial and legal complexity that particularly emerges when a firm takes a core strength in its domestic market and tries to rapidly expand this internationally across a number of different business streams concurrently.

From a relatively successful domestic base in India, the Adani Group is in the process of developing a A\$10.5bn portfolio of largely greenfield projects across a range of businesses in Australia – Figure 7. This involves a significant number of management, political, financial, legal, environmental and operational challenges, particularly for a firm that did not have an operational asset in Australia until June 2011. Having invested A\$2.8bn to date, there remains a huge investment in capital, interest expense and time before any sizeable earnings are possible.

Figure 7: Adani's Proposed Australian Investment

Purchase of Carmichael Coal from Linc Energy	500
Purchase of EPC 1080 from Mineralogy Pty Ltd	25
Purchase of Moray Downs	110
Mine development	5,490
Transmission line - 250km to Strathmore	300
Rail development	1,200
Purchase of Abbot Point Coal Terminal - T1	1,829
Adani Abbot Point Coal Terminal - T0	1,000
Total proposed investment (A\$m)	10,454

Invested to-date	
Purchase of Carmichael Coal from Linc Energy	500
Purchase of EPC 1080 from Mineralogy Pty Ltd	25
Purchase of Moray Downs	110
Estimated Mine Capex post purchase	250
Purchase of Abbot Point Coal Terminal - T1	1,829
Estimated T1 Port Capex post purchase	88
Total To-Date	2,802

3.6 Massive pipeline of projects ... capex of US\$25bn

The Adani Group has a massive pipeline of projects underway – in ports, in power stations, in mining and in Australia. The Adani Group has stated a target to become one of the largest coal mining, coal trading, power generating and cargo port companies in the world – all concurrently by 2020. This involves a target to expand volumes at a double-digit rate every year in each of the many different major businesses – Figure 8.

Adani Enterprises has stated this involves capital expenditure plans of upwards of US\$25bn in the next five years^{xi} – all to be funded by the Adani Group with a combined external equity market capitalisation of US\$5.17bn. This involves very significant operational and construction risks and is likely to involve a significantly increased level of financial leverage from already elevated levels – refer Section 3.7.

By 2015 Adani Enterprises plans to commission four greenfield coal mines in India with a peak capacity of 110Mtpa, an increase from zero in 2012/13. Adani Enterprises also plans to concurrently triple its Indonesian coal production and build the greenfield 60Mtpa Carmichael project in Queensland – the biggest coal project in Australian history. In 2012/13 alone Adani Enterprises capitalised exploration, evaluation and other costs of A\$186m relating to the Carmichael project (A\$63m in 2011/12), despite construction not having even started as yet.^{xiii}

In power generation, Adani Power commissioned its first coal-fired unit in 2009. As of March 2013, Adani Power had 7,260MW operational, with another 1,980 MW under construction. Beyond this, Adani Power has stated it plans to double capacity again in the following seven years, despite net debts of US\$6.55bn against an equity capitalisation of US\$1.56bn, and its loss-making status.

At Adani Ports, the Group has three ports in operation, with plans to commission another three ports at Mormugao, Vizag and Kandla across India over the next three years. At the same time Adani Ports is expanding Mundra's capacity by more than 20% to 245Mtpa, despite the three existing ports operating below 50% utilisation in 2012/13.^{xiv}

In Australia, the Adani family has acquired the long-term lease for a 50Mtpa coal export port terminal at Abbot Point, which continues to operate below 40% utilisation since its purchase in June 2011. The Adani Group proposes adding another 70Mtpa of capacity over two stages at Abbot Point (Terminal 0 project), plus a three-stage 90Mtpa greenfield development at Dudgeon Point (now on hold). Adani Enterprises also proposes to build a greenfield railway line for A\$1-2bn.

In addition, in India the Adani Group is expanding into solar generation, power transmission, gas distribution, warehousing, railways and special economic zone (SEZ) industrial parks.

The Adani Group has an extremely bold plan of concurrent and aggressive expansion across a multitude of industries, which will be largely debt-funded given the limited current profitability across the Group.

Figure 8: Bold, or reckless expansion?

Year to 31 March	2011	2012	2013	2020	CAGR 2020 vs '13
Coal Mining (Mtpa)	3	2	4	200	75%
Coal Trading (Mtpa)	33	36	46	100	12%
Power Generation (MW)	4,620	4,620	7,300	20,000	15%
Port Cargo (MMT)	52	66	91	200	12%

Source: Adani Group Presentation, August 2013^{xii}

3.7 Debt profile ... excessive indebtedness

The Adani Group has some strong operating business divisions generating consistent operating profits, particularly in Mundra Port, AAPCT and in coal trading. However, the Group as a whole has experienced a rapid rise in net indebtedness – from Rs9 crore as at 31 March 2009 to Rs75 crore as at 31 March 2013. In US\$ terms, this is a rise from US\$1.9bn as at 31 March 2009 to US\$12.0bn (using the prevailing spot rate in March 2009 and 2013 of Rs50.5 and Rs54.2/US\$1 respectively). We calculate this by adding the estimated US\$1.9bn of debt in AAPCT taken off balance sheet on 31 March 2013 from Adani Ports into the private family structure to lower the net debt as reported in the consolidated accounts of Adani Enterprises and Adani Ports – Figure 9.

Consensus forecasts for Adani Enterprises have net debt stabilising at March 2013 levels over the current year to March 2014 – Figure 10. This looks optimistic in our analysis, despite the two equity raisings (US\$180m in Adani Ports in June 2013 and US\$456m in Adani Power in May 2013), given the adverse impact on translation of US\$ denominated debt (refer Section 4.3), the continued high levels of capex and ongoing losses in Adani Power.

Figure 10: The Rise of the Adani Group's Net Debt Over the Last Five Years (by listed entity)

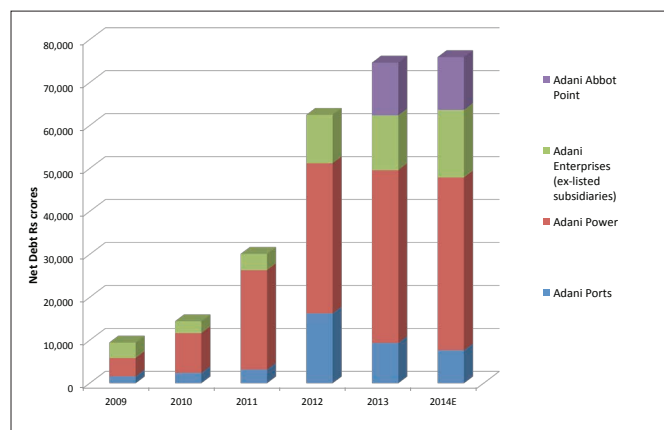


Figure 9: Adani Enterprises – Net Debt (breaking out share by listed entity)

31 March (Rs crores)	2009	2010	2011	2012	2013	2014 Est
Long term borrowings	12,084	17,439	24,253	48,894	48,850	
Current maturities of LT debt	0	0	2469	4216	7,664	
Short term borrowings	0	0	6,349	16,337	12,912	
Cash	-2,583	-2,919	-2,653	-6,514	-7,074	
Non-current bank balances	0	-43	-318	-457	0	
ST Loans and advances	-46	-63	0	0	0	
Net Debt	9,456	14,414	30,099	62,476	62,352	63,629

Share holders equity	3,019	6,038	17,727	19,490	21,459	24,052
Net Debt to BV Equity	313%	239%	170%	321%	291%	265%
Net Debt for Group	9,456	14,414	30,099	62,476	62,352	63,629

31 March (Rs Crores)	2009	2010	2011	2012	2013	2014E
By group of companies:						
Adani Ports	1,601	2,402	3,174	16,280	9,378	7,682
Adani Power	4,282	9,271	23,159	34,933	40,226	40,229
Adani Enterprises (ex-listed subsidiaries)	3,573	2,742	3,767	11,262	12,748	15,718
Adani Abbot Point					12,282	12,282
Total Net Debt - Adani Group	9,456	14,414	30,099	62,476	74,635	75,912

Source: Annual Reports for Adani Enterprises, Adani Ports and Adani Power 2009-2013, plus consensus estimates drawn from Thomson Reuters Analytics (27 October 2013)

Section 3

Adani Group: Background, Challenges and Opportunities (Continued)

For a group with such aggressive international expansion plans, net debt of US\$12bn and rising is both a major constraint and risk factor. To show the financial leverage another way, the net interest cover of Adani Enterprises was 1.7 times in 2012/13, a material deterioration from the already low 2.7 times in 2011/12. This means that 59% of all operating earnings in 2012/13 went to service the interest on debts accumulated – Figure 11. After capex there is no free operating cashflow to fund dividends or to cover for unexpected contingencies.

Further, this calculation excludes the entire interest expense associated with the purchase and development of the Carmichael project (an investment of A\$782m and rising), with over A\$28m of interest expense capitalised in 2012/13 alone. We note that Adani Enterprises charges interest expense to its Australian Adani Mining Pty Ltd (Adani Mining) subsidiary at LIBOR +4.25-4.75%, well above Adani Mining's external bank loan rates of LIBOR +3.0-3.5%. Given Adani Mining is a loss-making entity and the Adani Group has not paid and is unlikely to pay any corporate tax in Australia in the near future, the question of transfer pricing is unlikely to be raised.

The financial profile of Adani Power is significantly more tenuous than that of Adani Enterprises. The net interest cover of Adani Power was negative in 2012/13, reflective of the operating loss before interest and tax costs were booked. This was a material deterioration from the already very low interest in 2011/12 which saw operating profit equal to interest costs. The trend has deteriorated further in the six months to September 2013 – Figure 12.

As a standalone entity, Adani Ports has a relatively strong balance sheet following the sale of AAPCT to the Adani family's private group in March 2013 and the US\$180m institutional equity raising in June 2013.

Figure 11: Adani Enterprises – Net interest Expense and Net interest cover

Year to 31 March (Rs Crores)	2012	2013
Interest Expense	1,826	3,493
Interest Income	-393	-560
Net Finance Costs	1,432	2,933
Operating profit (EBIT)	3,929	4,939
EBIT / Net interest (times)	2.7	1.7
Net interest as a % of EBIT	36%	59%

Source: Annual Report for Adani Enterprises 2012/13

Figure 12: Adani Power – Net Interest Expense and Net Interest Cover

Year to 31 March (Rs Crores)	2012	2013	2014 1H annualised
Interest Expense	884	1,703	4,164
Interest Income	-142	-155	-155
Net Finance Costs	742	1,547	4,008
Operating profit (EBIT)	743	-295	-145
EBIT / Net interest (times)	1.0	-0.2	0.0
Net interest as a % of EBIT	100%	-525%	-2769%
Cash Interest Expense	884	1,703	n.a.

Sources: Annual Report for Adani Power 2012/13, Adani Power Interim 2014 result.

Section 4

Structural Problems at Adani Power

4.1 Adani Power: increased debt, lower profits and market value of equity

As detailed in Figure 5 above, Adani Power's share price has declined 68% over the last four years. Excessive financial leverage has been a key cause of this underperformance, with investors shying away from debt-laden companies developing non-economic power projects. However, other factors have also been material contributors, including: the inability to access domestic Indian coal supplies; a failure to hedge US\$ coal import costs against long-term fixed price power purchase agreements written in rupee terms; lower than forecast capacity utilisation rates; environmental, social and regulatory challenges and delays; and an excessively ambitious project commissioning pipeline relative to the inexperience of promoters.

The Adani Power 2011/12 annual report (page 12) states:

“Power project implementation is a herculean task considering various clearances from statutory authorities, land acquisition, rehabilitation and resettlement issues, local protests, funding availability due to sectorial exposure norms, scarcity of skilled manpower, the lack of bankable fuel tie ups and sluggish project implementation.”

The Adani Power 2012/13 annual report (page 13) states:

“The biggest grievance of private sector has been the long process of clearances, securing fuel linkages and delays in land acquisition. Inadequate domestic supply of quality fuel, viz. coal and gas results in higher costs of generation. Additionally, due to transportation bottlenecks at ports, high prices of imported coal, volatility in exchange rates and demand for expensive power, the imported coal may not fully cover deficit of domestic coal.”

Adani Power – excessive financial leverage

Figure 13 details the progressive rise of net debt to equity from 187% in 2008/09 to 937% by 2012/13. The Rs25bn (US\$456m) equity raising by Adani Power in May 2013 was funded by Adani Enterprises and a member of the Adani family, lifting issued share capital 20% in the process. This raising will cover the net losses of Rs23bn in 2012/13, but even with a reduced loss in 2013/14 forecast, Adani Power continues to suffer financial distress and rising net debt ratios.

Figure 13: Adani Power - Net Debt to Equity

31 March (Rs Crores / 10 million)	2009	2010	2011	2012	2013	Sept'13
Long term borrowings	4,990	10,586	21,688	29,585	33,192	34,852
Current maturities of LT debt	0	0	810	2,595	4,341	5,756
Short term borrowings	0	0	2,005	6,420	4,411	4,411
Cash	-558	-1,165	-964	-3,241	-1,718	-1,455
Non-current bank balances	0	0	-291	-426	0	0
ST Loans and advances	-150	-150	-89	0	0	0
Net Debt	4,282	9,271	23,159	34,933	40,226	43,565
Share holders equity	2,294	5,778	6,287	6,041	4,293	4,565
Net Debt to BV Equity	187%	160%	368%	578%	937%	954%

Source: Annual Reports for Adani Power 2009-2013

Structural Problems at Adani Power (continued)

Adani Power – low power plant utilisation rates

Lack of fuel supply and the associated infrastructure bottlenecks have been a major obstacle to the successful and profitable operation of Indian thermal power plants, even once financing and commissioning have been overcome. Adani Power reported a capacity utilisation rate of 62% in 2Q2013/14 and 63% in 2012/13, down from 69% in 2011/12.

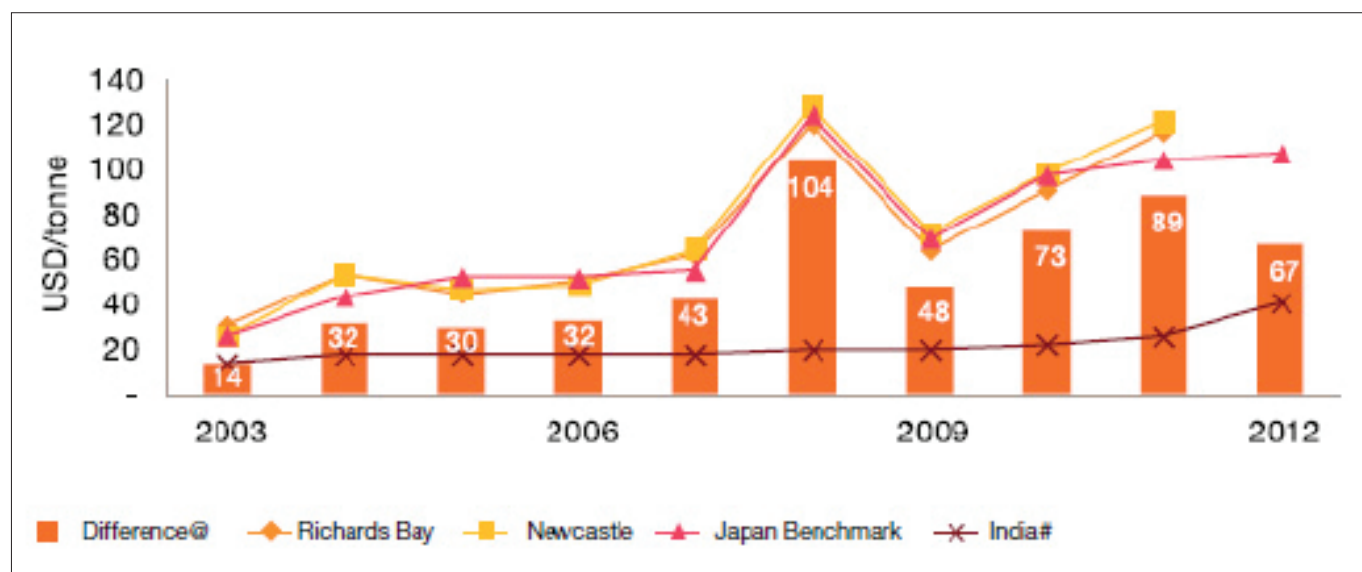
“Power projects today are stalled not because of lack of credit but because of lack of supply of fuel and uncertainties with regard to coal pricing and power tariffs, towards which the government has recently taken some measures.”

K.C. Chakrabarty, deputy governor of RBI, 9 August 2013

Adani Power – inability to source low priced domestic Indian coal

A key pressure point has been the inability to source sufficient domestic Indian coal, resulting in either a sub-optimal operating rate for the power plant and/or the added cost of sourcing imported coal at a significantly more expensive delivered cost. Adani Enterprises has been unable to develop its captive domestic coal block allocations, and coal supply from Adani Enterprises' Indonesian coal mine continues to run well below expectations. The sustained cost differential between domestic and imported coal is illustrated in Figure 14. The major devaluation of the Indian rupee against the US\$ has only made this differential more pronounced in 2013 – as discussed in Section 4.3.

Figure 14: Coal Price Movements – Domestic India vs Key Import Benchmarks



Indian benchmark D grade coal GCV range 5,200-5,500kcal/kg (conversion at Rs50/USD)

Source: PwC, 'The Indian Coal Sector – Challenges and future outlook', India Chamber of Commerce, November 2012.

Structural Problems at Adani Power (continued)

Adani Power – long-term off-take pricing contracts at excessively low prices

Like numerous other power producers in India, Adani Power signed a multitude of long-term power supply contracts in 2007-2009 at electricity prices that have subsequently proven uncommercial for the power generator. Adani Power failed to lock in enforceable domestic coal fuel supply contracts from Coal India Ltd or elsewhere. The tender process also meant Adani Power was unable to structure its contracts such that if Coal India Ltd was unable to deliver, Adani Power has the contractual right to adjust its supply pricing to reflect higher priced US\$ denominated coal imports as a substitute.

Adani Power is challenging the validity or sustainability of a number of its fixed price power purchase agreements, which have terms of up to 25 years. In 2012 Adani Power entered a plea in the Indian Supreme Court to terminate a legal contract to supply Gujarat Urja Vikas Nigam Ltd with power from 1,000 MW of capacity for 25 years at a levelised tariff of Rs2.35 per unit,^{xix} some 45% below the Rs4.45 per unit average wholesale merchant price of electricity cost in India in mid 2013. Adani Power's 2Q2013/14 result detailed its average fuel cost was Rs2.40/unit. This leaves no margin for depreciation, operating or financing costs. Recent hearings of the Central Electricity Regulatory Commission highlight the precedent that would be set in overturning a legally binding contract due to terms that have proven onerous after the event. ^{xx}

4.2 The Indian electricity sector

We view the current state of the Indian power market as fatally flawed. Commercial returns across the sector have not been achieved in recent years, as evidenced by the declining share market values of companies including Adani Power, Adani Enterprises, GVK Power & Infrastructure, Reliance Power and Tata Power. Excessive debt and expansion by inexperienced

operators have combined with major greenfield project commissioning delays to drain sector profitability and restrict finance availability.

It is not only the more established power sector operators which have been affected. The Economic Times reported that an estimated 35-50 gigawatts(GW) of thermal power projects at various stages of development in India are for sale, many being developed by firms outside their core area of competency. Having entered the sector over the last five years on the expectation that a growing electricity demand profile would provide opportunity and profits for all, promoters are now trying to exit their projects, along with the contingent liabilities and debt burdens.

One stated objective of the Carmichael project is to supply thermal coal into the Indian power market. We see this as a flawed strategy, given the conflicting dynamics of India. The government has provided massive subsidies to fossil fuel prices and state governments have held down electricity prices in an attempt to hold down inflation, but the former has pushed the government into a massive budget deficit. The importation of the majority of India's fossil fuel needs (oil, kerosene and cooking gas, and, increasingly, coal) has resulted in a massive trade deficit. Over only three years, India has seen coal imports rise from 9.9% of total domestic consumption in 2009-10 to 19.3% in 2012-13 – Figure 15.

This in turn has seen the rupee devalue by 30% against the US\$ in three years, putting upward pressure on consumer inflation, which is currently running at 9% pa. With almost all aspects of the electricity system carrying excessive financial leverage, most coal and electricity companies have seen their profit base eroded and suffered sustained share market underperformance. The controversy over government coal allocations to private companies, dubbed "Coalgate", and uncertainty around actual extractable reserves has seen the production of domestic thermal coal significantly below the government targets for a number of years. Importing even more US\$ denominated

Figure 15: Indian Coal Consumption – Domestic vs Imports

Year	Domestic Production (Mt)	Imports (Mt)	Total Coal Import Bill (Rs Crore)	Indian Demand (Mt)	Imports as a % of total coal consumption	Indian Demand Chg (yoy)	Indian GDP chg (yoy)
2009-10	489.0	54.0	39,180	543.0	9.9%	10.1%	8.0%
2010-11	476.0	67.0	41,550	543.0	12.3%	0.0%	8.4%
2011-12	481.0	92.0	78,837	573.0	16.1%	5.5%	6.5%
2012-13	492.0	118.0	81,013	610.0	19.3%	6.5%	5.0%
2013-14 (f)							4.0% ⁽¹⁾

(1) HSBC forecast - 2 September 2013

Source: Salva Report, 29 July 2013

Structural Problems at Adani Power (continued)

thermal coal is not a clear solution, and this solution will only be made worse by port, rail and grid infrastructure bottlenecks.

India's energy sector also suffers from an inability to align the price of electricity with the costs of producing it. The regulatory processes in India have, in response to political pressure, kept electricity prices low to the detriment of power providers and other energy interests. According to India's five-year plan a new, rational pricing structure with significant increases in prices and/or subsidisation is essential under current energy scenarios. This price restructuring is seen as a major challenge.

In addition, India's Power Finance Corporation issues requests for new power plant proposals with associated coal block allocations without first scoping the environmental suitability of the coal blocks. As a result, another arm of the Indian government, the Ministry of Environment and Forests (MoEF) can subsequently refuse mining permission, classifying the block as "no-go" due to potential environmental damage, particularly in rich forest areas or endangered species habitat. This was the case with the proposed 4,000MW ultra mega power projects (UMPPs) at Surguja in Chhattisgarh in October 2013. Indeed, this situation of investments being made in power plants and coal mines without appropriate prior environmental and social screening has resulted in many projects either getting significantly delayed or even scrapped.

A key area of concern is the exceptionally high level of debt in the multitude of state-owned electricity distributors, which have run at ongoing losses due to electricity theft, transmission losses (due to out-dated transmission and distribution assets) and below-cost power tariffs. The political opposition to higher electricity prices is a key impediment. This in turn impedes the ability of power generators to raise long-term finance due to the absence of credit-worthy power purchase agreements at commercial rates.

4.3 Impact of the rupee collapse ... US\$ debts

The Indian rupee has depreciated by 10% since Adani Enterprises' 31 March 2013 year end (when it was Rs54.3/US\$), and at the time of this report sits at Rs61.4 to the USD. This puts the rupee down almost 20% versus 31 March 2012 at which time the rupee/USD was 51.1 – Figure 16. The Adani Group has a number of exposures to the fall in the rupee. The three most significant impacts are all negative:

1. Adani Power has electricity power purchase agreements (PPA) priced in rupee terms, but its imported coal input costs are priced in USD. This exposure is materially higher than was planned by Adani Power on signing the PPAs due to

the Adani Group's inability to successfully develop various domestic Indian coal deposits allocated by the Government.

2. The Adani Group has taken out significant USD and AUD foreign currency loans against its overseas purchases. So while there is a natural balance sheet hedge in terms of foreign currency assets, the interest servicing requirements of the loans will strain the Adani Group whilst the projects are pre-revenue (for example, the Carmichael project) or running well below full capacity (for example, AAPCT). The Adani Enterprises' 2012/13 annual report states there were loans relating to AAPCT of US\$800m from the State Bank of India.^{xxvi} In addition, as of 31 March 2012 AAPCT had US\$1.15bn of AUD loans, giving a total indebtedness in AAPCT of US\$1.95bn.^{xxvii}

3. On an enterprise-wide basis Adani Enterprises' currency exposure is considerable given its other unhedged foreign loans in its funding mix. Adani Enterprises' consolidated accounts show net unhedged foreign currency loans of over US\$5.8bn as at 31 March 2013.

On this US\$5.8bn of foreign currency loans not covered by derivatives, the impact of the greater than 10% depreciation since balance date is around US\$580m in terms of additional rupee denominated debt on translation held on Adani Enterprises' balance sheet.

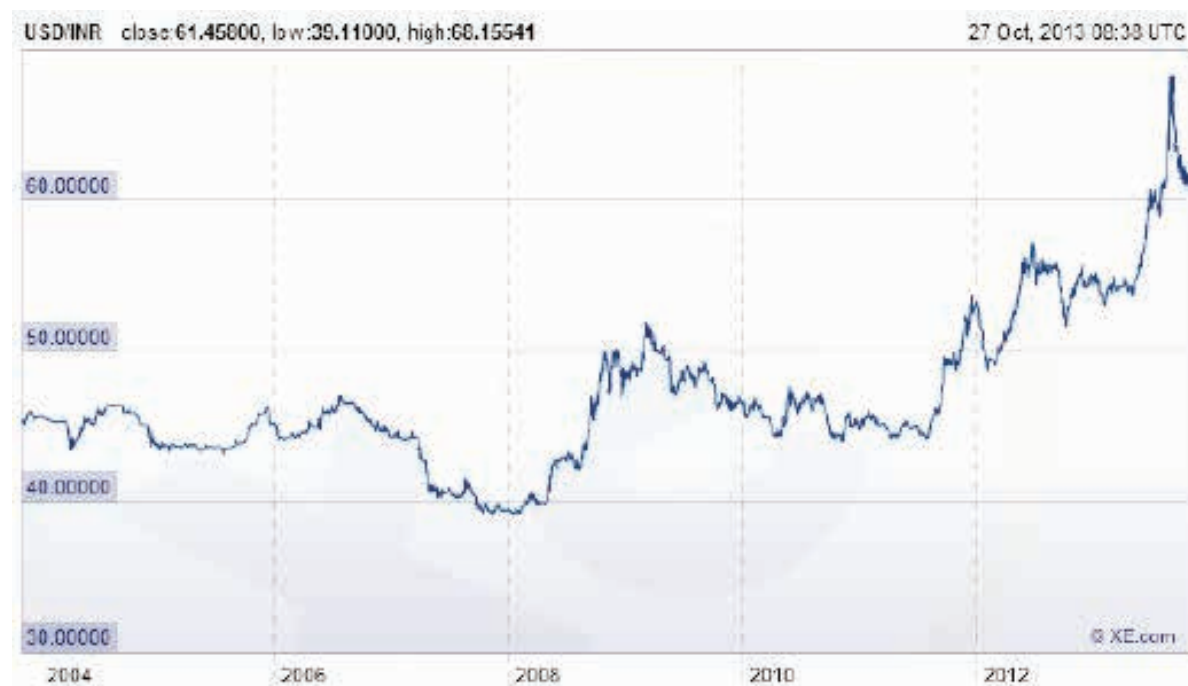
Mr Gautam Adani, Chairman of the Adani Group, stated:

“Under our internal analysis at group level, over the next three to five years, once a part of loans are repaid, we would have a positive impact if there were to be continued depreciation of the rupee.”^{xxx}

This suggests a number of steps are now being undertaken to hedge any further foreign currency impact, albeit after the 20% devaluation of the last 18 months has already impacted. We would also expect that the Adani Group's ability to refinance US\$1.5-2.0bn of existing loans in the international financial markets will also be significantly more difficult. Adani Enterprises will capitalise most of this additional interest expense, given it is held against projects yet to be commissioned.

Structural Problems at Adani Power (continued)

Figure 16: USD/INR Exchange Rate: 2004-2013^{xxix}



Source: XE.com

Section 5

Abbot Point Coal Terminal

5.1 Adani Abbot Point Coal Terminal – project overview

In June 2011 Adani Port acquired a 99-year lease over the established Abbot Point Coal Terminal (T1), a 50Mtpa capacity coal export facility, 25km to the north-west of Bowen in Queensland – Figure 17. The port includes rail in-loading facilities, coal handling and stockpiling areas. A single trestle jetty and conveyor connects to two offshore berths and two shiploaders 2.8km offshore. Adani Ports paid A\$1.829bn to the Queensland Government for this lease.

The AAPCT's value was strategically enhanced by Aurizon's Goonyella to Abbot Point Expansion (GAPE) project, a A\$1.1bn railway expansion completed in December 2011. The GAPE project involved the construction of the "Northern Missing Link" of 69km to connect the Newlands and Goonyella coal rail systems, and doubled rail coal capacity to Abbot Point to 50Mtpa.

The Queensland Government in November 2013 declared the Port of Abbot Point one of the five Priority Port Development Areas in Queensland.

An ongoing issue with the AAPCT is the inability of this coal export terminal to deliver on its 50Mtpa rated capacity. As Figure 18 shows, throughput at AAPCT has consistently been below 40% of rated capacity since 2010, running at 16-19Mtpa of volume. The Adani Group recently highlighted the trend of improvement, with the moving annual total of throughput in September 2013 at 19Mtpa, a record for the port but still only 39% utilisation. The Adani Group has consistently said the port's entire 50Mtpa of capacity is fully contracted, stating in June 2012: *"Long term Take or Pay agreements for entire 50Mtpa signed."*^{xxxii}

The entire Queensland coal industry until recently has stated it is constrained due to port capacity limitations, justifying a multitude of new coal export terminal plans – Figure 20. This is a risk for AAPCT's valuation, given increased coal port supply is planned to come online at a time of weaker than expected demand. Queensland's coal port utilisation averaged 63% over 2010-2012.^{xxxiii}

Figure 17: AAPCT – Coal Stockpile, Rail Link and Pier to T1

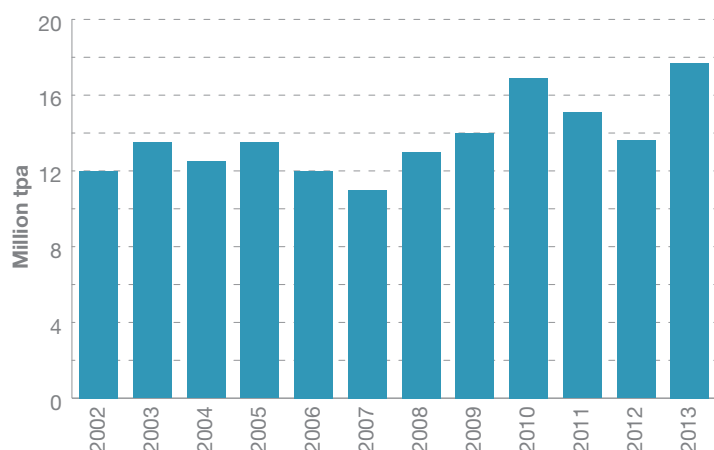


Source: Greenpeace/Tom Jefferson - beyondcoalandgasxxi

Section 5

Abbot Point Coal Terminal (continued)

Figure 18: AAPCT – Throughput of Coal Exports (June year end)



Source: North Queensland Bulk Ports Corporation

The total Queensland coal export port capacity (coking and thermal combined) in 2013 is around 264Mtpa – Figure 19. The Dalrymple Bay Coal Terminal at 85Mtpa, owned by the Canadian-listed Brookfield Infrastructure Group, is rated as the third largest coal export port in the world, with the Port of Gladstone at 75Mtpa rated as the fourth largest. Should AAPCT move towards full utilisation of its 50Mtpa rated capacity, this would put it as one of the world's largest coal export terminals.

Figure 19: Queensland Ports for Exporting Coal

Port	Asset Description	Owner	Operator / Leasee	Coal Capacity (Mtpa)
Abbot Point	Abbot Point Coal Terminal	North Queensland Bulk Ports Corp. Ltd	The Adani Group (99 year lease)	50
Hay Point	Hay Point Services Coal Terminal	BHP Billiton-Mitsubishi Alliance (BMA)	Hay Point Services Coal Terminal ⁽¹⁾	44
Hay Point	Dalrymple Bay Coal Terminal	North Queensland Bulk Ports Corp. Ltd	DBCT P/L ⁽²⁾ (99 year lease to 2100)	85
Hay Point	Dudgeon Point expansion - on hold	Adani Group / Brookfield Infrastructure Group	Nil	Nil
Brisbane	Fisherman Islands Coal Terminal	Queensland Bulk Handling (New Hope Coal)	Port of Brisbane Pty Ltd ⁽³⁾ (99 year lease)	10
Gladstone	RG Tanna Coal Terminal	Gladstone Ports Corp.	Gladstone Ports Corp.	68
Gladstone	Barney Point Coal Terminal ⁽⁴⁾	Gladstone Ports Corp.	Gladstone Ports Corp.	7
Gladstone	Wiggins Island Coal Export Terminal (WICET)	Gladstone Ports Corp.	Gladstone Ports Corp. ⁽⁵⁾	Nil (27Mtpa target)
Total Queensland Coal Export Capacity - 2013				264

(1) BMA is upgrading the Hay Point terminal by 11Mtpa to 55Mtpa, completion due April 2014. Aurizon is supporting this with a \$130m Goonyella System rail upgrade.

(2) Dalrymple Bay Coal Terminal Pty Ltd (DBCT) is the Australian subsidiary of the Canadian listed Brookfield Asset Management Limited.

(3) The Port of Brisbane is jointly owned by IFM, QIC, Global Infrastructure Partners and Abu Dhabi Investment Authority.

(4) Gladstone Port's Barney Point Coal Terminal is in the process of being converted to other products

(5) WICET in total is projected to cost \$2.5bn to build for 90Mtpa, with Phase I of 27Mtpa due for commissioning in March 2015.

Section 5

Abbot Point Coal Terminal (continued)

Figure 20 details the main Queensland coal port expansion plans still in active consideration. Should a number of these come to fruition, AAPCT could face some contract repricing risk to its major cornerstone customer, Glencore Xstrata, whose 13Mtpa contract expires in mid-2019.

In October 2013, energy and mining research group Wood Mackenzie warned with respect to the new Wiggins Island coal export facility at Gladstone:

“Over the opening years of the terminal, between 2015 and 2017, we’d expect capacity utilisation between 40-60% ... That’s a result primarily of projects that are due to be feeding Wiggins Island not being developed on the original timetable that was planned.”

Figure 20: Queensland Coal Port Expansions Being Considered

Port	Owner	Status	Capacity addition (Mtpa)	Likely completion
Hay Point	BMA	Under construction ⁽¹⁾	11	2014
Gladstone	WICET – Stage 1 ⁽²⁾	Under construction	27	2015
Abbot Point	Adani T0 – Stage I	EIS review	35	2017
Abbot Point	GVK T3 – Stage I	EIS review	30	2017
Abbot Point	NorthHub T4 ⁽³⁾	In planning	n.a.	n.a.
Gladstone	WICET – Stage 2 ⁽⁴⁾	In planning	32	2019

Source: Queensland Department of Transport and Main Roads

(1) The BMA port expansion is being supported by Aurizon’s \$185m Goonyella Rail Expansion.

(2) The WICET is being supported by Aurizon’s A\$900m Wiggins Island Rail Project to expand rail connections in the Southern Bowen Basin, due on line March 2015.

(3) In April 2013 Aurizon (75%) and Lend Lease (25%) announced they had been shortlisted alongside AngloCoal by the Queensland Government to consider building AP-X, a multi-user coal export facility.

(4) WICET - Stage 2 was planned to coincide with Glencore’s Wandoan Coal development and the associated 210km greenfield Surat Basin Rail - now on hold as of September 2013.

(5) In May 2013 Glencore Xstrata announced they had scrapped plans to build a A\$1bn 35Mtpa coal export facility at Balaclava Island, 40km North of Gladstone.

5.2 Transfer of AAPCT from Adani Ports to Adani family

In March 2013 the Adani Group announced it was transferring ownership of AAPCT from its listed Adani Ports entity to a new non-Indian domiciled private company 100% owned by the Adani family for a consideration of A\$235.7m.^{xxxv}

Technically Adani Ports remains 99% owner of the ordinary equity in AAPCT trust (via the Mundra Port Holding Trust), which has created a sublease of the port held by AAPCT Pty Ltd. However, with the Adani family now owning 100% of the redeemable preference shares outstanding against AAPCT Trust, we understand this transfers the full economic value of AAPCT to the family.

This looks to us like a complicated and opaque cross-border corporate restructuring designed by lawyers and accountants for financing, tax and political agendas rather than operational logic.

The other change inserted during this March 2013 transaction is that the Adani family now holds its equity stake in AAPCT via a Singaporean domiciled private company 100% owned by the Adani family, rather than having AAPCT owned by the Indian domiciled and listed Adani Ports. Given the Reserve

Bank of India in August 2013 proposed to dramatically reduce the allowable limits to foreign assets held by Indian residents, the timing of this restructuring within the Adani Group was fortuitous.^{xxxvi}

5.3 Price paid of US\$2.2bn for revenues of US\$195m pa?

The Adani family agreed to buy the Adani Ports' equity stake in AAPCT for A\$236m on 31 March 2013, resulting in a gain on sale for Adani Ports of Rs4.2bn (US\$77m). In addition, the Adani family takes onboard the existing loan facilities outstanding within the AAPCT legal entities, possibly as much as US\$1.95bn. These include a US\$800m loan from the State Bank of India^{xxxvii} and a drawn down A\$1.14bn of a second AUD syndicated loan facility – refer Appendix D.

In May 2011, Adani stated AAPCT was expected to deliver revenues of A\$110m and with an operating profit (earnings before interest, tax, depreciation and amortisation, or EBITDA) margin of 54%, EBITDA of A\$59m.^{xxxviii} Adani Ports' annual report states revenue for AAPCT in the 10 months of consolidation during 2011/12 was US\$112m, which translates to US\$146m annualised. AAPCT revenues in 2012/13 increased to US\$195m – Figure 21.

Figure 21: AAPCT – Profit & Loss: 2011/12 and 2012/13

Year ended 31 March Rs million	2012 10 months Rs million	2012 annualised Rs million	2013 12 months Rs million	2012 annualised US\$m	2013 12 months US\$m
Revenue	5,817	6,980	10,611	146	195
Operating expenses	-2,577	-3,092	-3,746	-64	-69
EBITDA	3,240	3,888	6,865	81	126
Depn & Amort.	-1,471	-1,765	-3,344	-37	-61
EBIT	1,769	2,123	3,521	44	65
Finance costs	-1,954	-2,344	-7,212	-49	-132
Pretax Loss	-185	-222	-3,691	-5	-68

Tonnage	13,283,183	15,679,045
Revenue per tonne (US\$/t)	\$10.96	\$12.43
Revenue per tonne (A\$/t)	\$10.60	\$11.94
Revenue per tonne (US\$/t) - ex TOP		\$8.28
EBITDA Margin	55.7%	64.7%
EBIT Margin	30.4%	33.2%
EBITDA / Net finance costs (x)	1.66	0.95
USD / Rs exchange rate - average for period	47.946	54.451

Source: Adani Ports Prospectus, 5 June 2013 page 266

Section 5

Abbot Point Coal Terminal (continued)

During 2011/12 the annualised tonnage of coal exported from AAPCT was 13.3Mt, giving a US\$11/t (A\$10.60/t) charge. AAPCT volumes were 13% higher in the 2012/13 year at 15.7Mt, giving a charge of US\$12.43/t (which translates to A\$11.94/t) – materially higher than the underlying Australian rates of around A\$6/t due to the receipt of US\$65m of take-or-pay penalties in 2012/13.

This translates into a 2012/13 revenue-to-enterprise-value multiple of 11.5x; whilst well down from 15.3x 2011/12, this is still a very generous price.

AAPCT has made progress in increasing its 2011 EBITDA margin of 54% to a 2012/13 margin of 64.7% (with a target of matching Adani Ports' Indian operating rates of around a 75% EBITDA margin), this still implies an enterprise-value-to-EBITDA multiple (EVM) of 17.7x 2012/13 – Figure 22. The inverse of the EVM is 5.6% - representing the gross cashflow yield in 2012/13.

This represents insufficient gross cashflow to cover the interest carrying costs, and AAPCT reported a net loss before tax of US\$68m in 2012/13, reflecting the excessive gearing carried by the newly acquired Australian business and low capacity utilisation rate. We would expect volume throughput to improve materially into 2014, but this is likely to be largely offset by a commensurate fall in the charge per tonne back to Australian coal industry norms of A\$6/t.

Figure 22: AAPCT – Enterprise Value Ratios (x)

Year to March	2011/12		2012/13	
EV / Sales	15.3	x	11.5	x
EVM	27.5	x	17.7	x
EV / EBIT	50.4	x	34.5	x

EV	A\$m		US\$m	
Equity	236		246	
Debt - US\$	768		800	
Debt - A\$	1,140		1,187	
Enterprise Value (\$m)	2,144		2,233	

Forex - USD to AUD			1.041	
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Abbot Point Coal Terminal (continued)**5.4 AAPCT – expanding from 6Mtpa to 240Mtpa?**

AAPCT was initially commissioned in 1984 with a capacity of 6Mtpa. It was expanded to 11Mtpa by 2007, and then rated capacity was more than doubled again to 25Mtpa in 2009.

AAPCT was expanded from 25Mtpa to 50Mtpa in 2010 with estimated expenditure of A\$913m. Commissioning was completed in January 2012. This was deemed *“a relatively expensive initial investment, and represents the step function inherent in development of new corridors.”*^{xli}

AAPCT T0 is a further proposed expansion involving another more doubling of Abbot Point Port’s current capacity by the Adani Group. This would see the addition of 70Mtpa of new coal export loading capacity over two stages, each of 35Mtpa. This would see two new berths each with a single 10,000t/hour ship loader operating at a target 80% of the time (i.e. 80% of 24 hours per day, 365 days a year).

The Adani Group has stated its target is to commence construction work in 4Q2013 such that the target commencement of T0 operations was 2016.^{xlii} However, the EPBC Act approval is still outstanding and as of October 2013, first coal shipments are now not expected until 2017.

^{xliii} Consultancy firm BMT WBM was appointed in April 2013 to undertake the detailed engineering design. ^{xliii}

Given the downturn in the coal market over the last year, a number of Queensland coal export port expansions have been delayed or cancelled. The BHP Billiton-Mitsubishi Alliance (BMA) proposal for a 60Mtpa coal export terminal (T2) at Abbot Point has been withdrawn due to adverse market conditions.^{xliv} The expansion plans for Abbot Point Port are detailed in Figure 23:

5.5 Abbot Point Port – approval delays and changes

In April 2013 Aurizon and Lend Lease’s joint NorthHub consortium was shortlisted, along with Anglo Coal, by the Queensland Government as the two proponents to examine a new multi-user, staged coal terminal and associated rail infrastructure at AP-X. Aurizon noted that this development:

“is separate to the recently announced proposal by Aurizon and GVK Hancock to develop multi-user rail and port infrastructure at Abbot Point using GVK Hancock’s existing T3 terminal (proposal).”^{xlv}

On 8 July 2013 the decision on dredging at Abbot Point, essential for both Adani and GVK’s coal export terminal projects was delayed for a month.^{xlvi} On 8 August it was deferred for a further three months and was due in November 2013.^{xlvii} Then, in October 2013, the decision was further delayed and is currently due in December 2013.^{xlviii} This delay means the AAPCT T0 will not be ready for exports until 2017.^{xlix} The decision on the plan to dredge three million tonnes of spoil and dump it at sea is controversial, given it will occur within the Great Barrier Reef World Heritage Area and is likely to cause environmental damage. The actual site for this spoilage to be dumped has not been agreed. Debate is now considering extending the pier at an additional capital cost of A\$360m or requiring the spoil to be dumped onshore, again at significant extra capital cost.

Figure 23: Abbot Point Coal Terminal – Expansion Plans

Project Name	Status	Next step	Proponent	Description
T0	Proposed	Waiting on EIS approval	AAPT	35m tpa coal export terminal + associated rail ⁽¹⁾
T1	Existing	Utilisation ramping up from 40%	AAPT	50m tpa coal export terminal + associated rail
T2	On hold		BMA	60m tpa coal export terminal + associated rail
T3	Proposed	Waiting on Financial close	GVK Hancock	60m tpa coal export terminal + associated rail
AP-X	Proposed	In planning		NorthHub AP-X - a multi-user coal export facility.
T0 / T2 / T3 Dredging		Waiting on EIS approval	NQBP ⁽¹⁾	Combined dredging proposals

(1) NQBP - North Queensland Bulk Ports Corporation.

Section 5

Abbot Point Coal Terminal (continued)

Following the September 2013 Federal election, a decision by the new Federal Environment Minister, Greg Hunt, is pending on both the dredging and Adani's T0 project.

The Great Barrier Reef Marine Park Authority plays a critical role in protecting the Reef, setting development policy for the region and helping to assess port developments. However, an October 2013 ABC 7.30 Report raised a number of questions with respect to conflicts of interest relating to two members of the Board of the Marine Park Authority. The potential conflicts relate to relationships with two companies, Guildford Coal and a second, Gasfields Water and Waste Services, a company jointly founded in June 2013 with Mr Eddie Obeid, Jr.ⁱ As a result of this, Greg Hunt has ordered an independent probity inquiry into the allegations raised.ⁱⁱ

5.6: Dudgeon Point Port expansion on hold

Dalrymple Bay terminal's operator, Canada's Brookfield Infrastructure Group, and Adani Mining were allocated land by the Queensland Government in late 2011 to build one coal terminal each at Dudgeon Point at the Port of Hay Point.

However, construction of the two new coal export terminals at Dudgeon Point in Queensland has been delayed until at least 2015 because of lower global coal demand, the state-owned North Queensland Bulk Ports Corp said in June 2013.

ⁱⁱⁱ Construction was originally due to start in mid-2013 on the estimated A\$12bn total cost for these projects. The terminals would be adjacent to the Dalrymple Bay coal terminal and 25 km south of Mackay on Queensland's central coast. They were designed to have a combined capacity of 180Mtpa.

Section 6

Rail Options for Adani Mining in the Galilee Basin

Adani Mining has outlined three options for connecting the Carmichael coal deposit to the coal export terminal at Abbot Point Port:

1. Option 1 – from mine site, 118km east to the proposed standard gauge Alpha Railway and then 325km north-east to Abbot Point Port (utilising part of the 495km greenfield rail proposal by GVK Power's Alpha Coal mine and rail project);
2. Option 2 – from the mine site, 190km along a dual standard/narrow gauge line to the existing narrow gauge Goonyella system (the "East-West" proposal), connecting 8km south of Moranbah; and/or
3. Option 3 – from the mine site, 70km to the east of Carmichael deposit, then north to the Abbot Point Port via a 300km standard gauge greenfield railway ("the North Galilee Basin Rail project").

Option 1 is dependent upon GVK Power of India developing its own US\$10bn Alpha Coal mine and rail proposal, a proposal we believe is unlikely to proceed in its current form. We note that having the combined coal volume of Adani Enterprises' Carmichael mine (60Mtpa) and GVK's Alpha Coal mine (30Mtpa) would give significant critical mass to this rail option, should the two companies be able to work together effectively. However, to date there has been little to suggest such co-operation is progressing. Adani Mining recently stated:

"The Alpha Railway, besides being a much longer route to Abbot Point from the north Galilee Basin, traverses through the large flood plains of the Sutter and Bogie Rivers, which pose serious challenges for construction and maintainability of a heavy haul rail option. Further, uncertainty with regard to timeframes and commitments around construction of the Alpha Project are a constraint to adoption of this proposal." ^{lv}

Option 2 in our view is the most likely scenario, given it involves the least greenfields rail development. Adani Mining estimated this option would have a capital cost of A\$1.2bn. Whilst it does require the construction of a greenfield railway line of 190km, by linking-in to Aurizon's existing railway network, it best leverages existing infrastructure (providing better rail and port system optionality), albeit of the lower volume narrow gauge type. Aurizon CEO Lance Hockridge best summarised this:

"In my world right now, brown is the new black. Brownfields railways, brownfields ports, brownfield mines... new and capital-intensive greenfield projects seem all but a memory." ^{lvi}

However, Adani Mining has publicly stated that it is reluctant to progress Option 2 as its preferred route. The existing narrow gauge system means smaller scale - lower volumes per train and lower train speeds due to older, less purpose built track. Additionally, Adani Mining states:

"Through ongoing engagement with Aurizon, it was determined that rail access to the port of Abbot Point via Moranbah is not only a longer route, but also increases the burden on the network as the existing system will require significant upgrade to support the additional capacity requirements." ^{lvii}

Option 3 involves the recently announced North Galilee Basin Rail project. Adani Mining proposes to build a greenfield railway 70-100km east from the Carmichael mine to Mistake Creek, then approximately 300km north-east to Abbot Point Port. Adani Mining's Initial Advice Statement lodged in May 2013 for the second section of 300km states a capital cost of A\$2.2bn,^{lviii} suggesting the entire 400km line would cost upwards of A\$3bn.

Without a shared rail link from the Galilee Basin to an established coal export port, in our view there will be no successful development of the huge thermal coal deposits present. It is telling that in November 2011, Jason Economidis, Director of Growth Projects for VALE Australia, stated:

"If all providers build their own rail, that would cost north of A\$4bn each. Based on the low margins associated with thermal coal, individual rail corridors are very unlikely to be viable."

Rail Options for Adani Mining in the Galilee Basin (continued)

Fast forward two years, and there has been no visible progress towards a shared rail network from the Galilee Basin. We think it is telling that VALE SA of Brazil has taken a US\$1bn write-down on its Australian coal assets and in July 2013 put its Degulla coal deposit in the Galilee Basin up for sale, suggesting they do not see much probability for profitable development.^{ix}

6.1 Narrow versus standard gauge

There are arguments for and against narrow versus standard gauge railways. As Aurizon's 2009 Coal Rail strategy plan states - on the positive:

"It would be possible to build new standard gauge rail corridors in central Queensland which would have higher efficiency than existing corridors. QR Network has existing standard gauge and dual gauge track in south east Queensland ... to the NSW border. The existing port precincts are currently serviced by existing narrow gauge rail corridors of substantial length."

On the negative:

"Therefore it is unlikely that economic and network capacity analysis will support building additional standard gauge rail corridors to these port precincts in the short term. This is because there are substantial benefits in expanding the existing network instead. Incremental tonnage increases only require incremental expansions rather than the construction of a whole new network. In addition, there is the benefit of interoperability of trains across the existing network ... to avoid stranded assets."^{ixi}

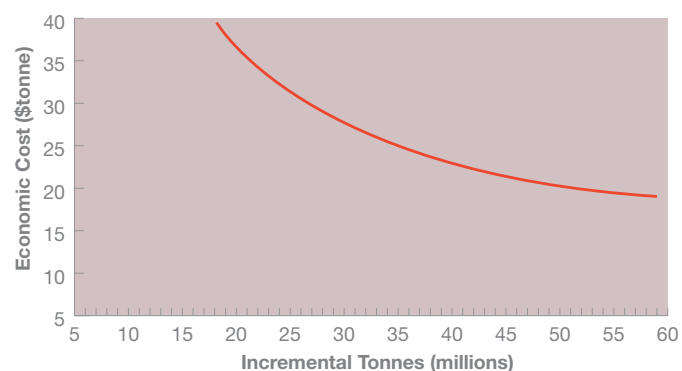
6.2 Rail cost to Abbot Point Port ... A\$15-16/t

Aurizon's "2009 Coal Rail Infrastructure Master Plan" refers to the economic cost of transporting Galilee coal to Abbot Point Port, and references a cost of A\$18-19/t at 60Mtpa capacity,

but with this cost rising steeply to A\$30/t at 25Mtpa utilisation and above A\$40/t below 20Mtpa – Figure 24.^{ixii}

This is a key cost constraint on any analysis of the Galilee Basin – even assuming a greenfield project of 60Mtpa, a scale never done before in Australian black thermal coal mining history, the rail cost is prohibitively high, particularly when coupled with a high strip ratio, high ash content and well below benchmark energy content.

Figure 24: Galilee Basin to APCT – Incremental Economic Cost of Rail



Source: 2009 Coal Rail Infrastructure Master Plan, QR Network

This is above our conservative estimate of A\$15-16/t which we have based on Aurizon's average 2012/13 revenue of A\$0.043/km/t over 400 km, less a 10% discount for the scale of volume and distance – Figure 25. A discount per km/t is likely given the scope for Adani Mining and/or Aurizon to leverage this greenfield project to other proposed coal developers in the Galilee.

However, against this, we note that Aurizon has proposed to the Queensland Competition Authority a new 36% average tariff increase in its 2013 Access Undertaking ("UT4") relative to its 2010 Access Undertaking ("UT3"). A tariff increase of this size would cost the Queensland coal industry A\$300m annually in extra freight charges. Depending upon which rail option Adani Mining chooses, Carmichael could be exposed to charges from Aurizon, a monopolistic rail provider.

Rail Options for Adani Mining in the Galilee Basin (continued)

6.3 A deal with Aurizon?

In June 2013 Aurizon gave an update on its strategic plan for “Co-ordinated Rail and Port Development”, which continues to be predicated on Wood Mackenzie’s bullish forecast that “Demand for seaborne thermal and metallurgical coal is projected to more than double by 2030 (from 2012 levels).” As the key assumption underpinning this doubling of global seaborne coal trade, China was expected to deliver a 305% increase from 2012 levels by 2030 to become by far the largest importer of coal at almost half of all global traded coal imports.

We would note this bullish projection is used to underpin many companies seeking to justify coal developments, including GVK. However, it stands in direct contradiction to the very detailed Bernstein Research’s June 2013 report “*The Beginning of the End of Coal*” that forecasts China’s coal consumption will peak by 2015 and that China will return to being a net exporter of coal on an opportunistic basis whenever the coal price shows any strength.^{lxvi}

Figure 25: Rail Costs per Tonne (A\$/t)

Aurizon – Coal	FY2011	FY2012	FY2013
Tonnage (million)	181.6	185.6	193.7
ntk (billion)	40.9	41.9	43.6
Revenue (\$m)	1,691	1,772	1,863
Km / tonne	225	226	225
Revenue (per ntk)	\$0.041	\$0.042	\$0.043
Carmichael to Abbott Point			400
Rail cost per tonne (A\$)			\$17.09
Rail cost – assuming a 10% discount (A\$/t)			\$15.38
ntk – revenue per net tonne km			

Source: Aurizon annual report 2013

Section 7

Carmichael Coal Project: Economic and Financial Risks

7.1: Carmichael Coal – low energy, high ash, deep, significant overburden

The key coal mine parameters for the Carmichael deposit are detailed in Figure 26:

Figure 26: The Carmichael Coal Mine Parameters

Mine Licence	EPC1690, EPC1080
Mine Type	Open cut & Underground
Mine Area	44,700 hectares
Indicated and measured resource	4,400 million tonnes
Inferred Resource Estimate	5,740 million tonnes
Strip ratio (tonne:tonne)	15.8 : 1
Strip ratio (bcm: tonne)	5.8 : 1
Overburden removal	220 million BCM pa
Run of Mine (ROM) Coal	50 million tonnes pa
Average yield	79%
Saleable production	40 million tonnes pa
Total Moisture (post washing)	18%
Average Ash content (raw)	26%
Average Ash content (post washing)	25%
Energy Content (kcal NAR)	5,260
Life of mine	60 years
Distance from existing rail	190 kilometres
Distance from port	400 kilometres
Distance from dam water	220 kilometres

(1) Adani suggests that the resource is 10 bn tonnes as at Aug 2013, no details.
40MTPA Opencut, 20Mtpa U/G

All run of mine (ROM) coal will be transported by truck and / or overland conveyor to a centralised coal handling facility, where any high ash (>25% ash) portion will be washed for blending with the bypass coal (unwashed coal).

Ord Minnett resources analyst Peter Arden described the Carmichael deposit as uneconomic due to its low quality:

“Indian companies are accessing what we would’ve previously considered as uneconomical, marginal, at best, thermal coal. The world is hungry for thermal coal, a lot of our Newcastle and Queensland traditional thermal coal is much higher quality going into Japan and South Korea. They don’t normally sell down around that quality but Indians are very happy to take it.”^{lxvii}

Carmichael Deposit ... low energy content

One of several key constraints of the Carmichael deposit is that it has a stated energy content of 5,400-5,500kcal (GAR), well below the traditional Newcastle benchmark 6,300kcal (GAR). The relative energy content benchmark and pricing implications are detailed in Figure 27:

Carmichael Coal Project: Economic and Financial Risks (continued)

Figure 27: The Carmichael Coal – Energy Content & Pricing

	GAR	% of GAR benchmark	NAR	Current price US\$/t	Price differential
Newcastle benchmark 6,080Kcal	6,300		6,080	US\$79.40	
Newcastle benchmark 5,500Kcal	5,699	90%	5,500	US\$62.50	79%
GVK Alpha deposit	5,800	92%			
Adani Carmichael deposit	5,450	87%	5,260	US\$59.77	75%

Figure 28 details the continued decline over 2013 for the FOB Newcastle 5,500kcal NAR pricing, with the price down from US\$75/t at the start of 2013 to US\$67/t in July 2013, with a further US\$4-5/t fall to US\$62.50/t in October 2013 reported by *Platts*.

When we estimate the cash cost of production for the Carmichael mine (see Section 7.4) we adjust the cash cost to reflect the energy equivalent of that assumed in the Newcastle FOB 6,080kcal benchmark.

Carmichael Deposit ... a strip ratio of 15.8:1

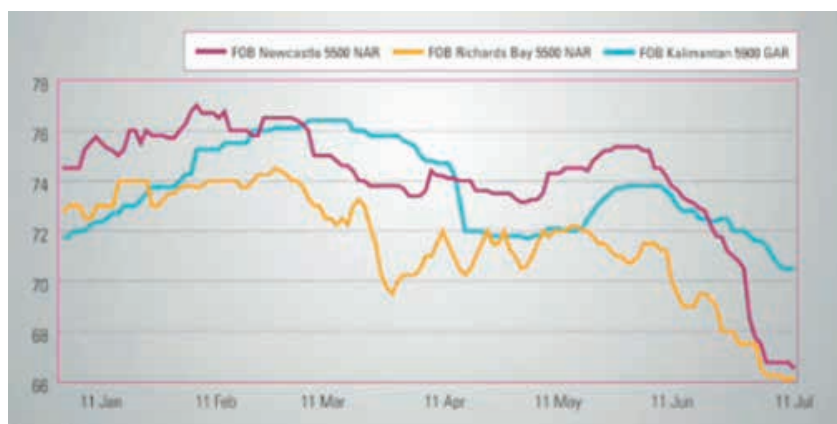
A strip ratio is a measure of how much overburden rock needs to be removed before an open-cut mine can access the coal. We estimate a strip ratio of 15.8t/t of coal; Adani Mining refers to a 6:1 bank cubic metres (BCM)/t ratio – two ways of stating the same ratio.

Over the 60 year mine life, the Carmichael mine has a target of 50Mtpa ROM output, with a recovery yield of 79% to give saleable coal of 40Mtpa. During the twenty years of peak production over 2020-2039, the Carmichael mine is targeted to produce 72Mtpa of ROM thermal coal, with a yield of 81% to give saleable coal of 58.5Mtpa (for ease of comparison, we accept Adani Mining has rounded this approximation to a 60Mtpa target at peak production). The Carmichael deposit has eight seams of a combined thickness of 25-35 metres.^{box} The open cut mining will have a depth of up to 280 metres.^{box}

There is no strict convention when it comes to quoting a strip ratio. It can be quoted in terms of tonnes of rock overburden to every tonne of coal produced or alternatively in terms of **volume of rock overburden moved** for every tonne of coal produced.

Coal is half as dense as overburden rock. Given rock found in association with coal deposits has a general density of ~2,700kg/cubic metre, this is roughly double the ~1,300kg/cubic metre of coal. So a tonne to tonne strip ratio will be more than double the strip ratio when expressed in terms of volume (expressed as bank cubic metres or “BCM”).

Figure 28: The Carmichael Coal – 5500kcal NAR Newcastle Benchmark Price (US\$/t, Jan-July 2013)



Source: Platts

Carmichael Coal Project: Economic and Financial Risks (continued)

Adani Mining estimates the overburden removal volume is 220 million BCM pa over the 60 year life of the mine. The Carmichael proposal is for a series of six open cut mines to give a total of 40Mtpa ROM coal, plus 3-5 underground mines of a combined 10Mtpa, to generate the 50Mtpa ROM total, with a yield of 79% to give 40Mtpa of product coal. Overburden only relates to open cut mining, the strip ratio is based on overburden of 220M BCM to 40Mtpa ROM open cut output or 5.8BCM:1t. We will reference this 5.8:1 in estimating the cash cost of production for open-cut coal in section 7.4. So to make this comparison in terms of tonnage, we need to increase the BCM of rock per tonne of coal by 2.7x, giving a 15.8:1 strip ratio on a **tonne of overburden removed** per tonne of coal produced.

Carmichael Deposit ... high ash content

One of the key issues Adani Enterprises faces is the very high ash content of the Carmichael thermal coal. With an ash content of 25-30% before washing and blending, this coal would not comply with proposed new Indian rules with respect to imported coal for UMPPs in India.^{boxvii} The stipulated maximum ash content set by India's Ministry of Environment and Forests (MoEF) is 12%. *"The validity of environmental clearance granted is subject to compliance with the coal quality parameters indicated,"* the Ministry said in its memorandum.^{boxviii}

Getting the ash content for Carmichael coal down from 25-30% to 12% is likely to pose significant challenges for Adani Enterprises with respect to their strategy of vertically integrating from the Carmichael project through to the supply of thermal coal into Indian UMPPs. The Environmental Impact Statement (EIS) shows the coal produced will vary from 20-40% ash, with an average of 25% over the mine life forecast. With the 75% level of coal preparation and washing forecast by Adani Mining, this gives a 79% yield over the life of the mine.

AME estimates that every 1% higher ash content over the 5,500kcal benchmark assumption of 20% would result in a price penalty of US\$0.50/t.^{boxix} The implication is that working with the September 2012 EIS assumption of an ash content averaging 25% would result in a US\$2.50/t penalty to Adani.

Carmichael Deposit ... coal mine yield of 79%?

A major revision from the Initial Advice Statement of 22 October 2010 to the Environmental Impact Statement of September 2012 saw the forecast yield of the Carmichael project lifted from 86% to 99% in the first 25 years of full production. The reason for this substantial upgrade was not presented. The Supplementary Environmental Impact Statement of November 2013 referenced "editorial errors" in the earlier EIS for the mine plan and this saw the average yield assumption revert back to a more realistic 79% yield, consistent with the Australian sector average.

Yield is defined as the ratio of run-of-mine coal to saleable coal, with the Australian coal sector generally in the range of 70-80%. To illustrate, Rio Tinto's Australian coal mines average yield sits at 76%, ranging from Warkworth at 65% on the low end to the Clermont mine as the standout at 96% due to its extremely large coal seams (approaching 30 metres). GVK's Alpha mine works on an assumed yield of 76% and China First assumes a 72% yield as two other comparisons.

Carmichael Deposit ... open cut mining to 280 metres depth

While the discussion on strip ratios quantifies the level of rock overburden that needs to be removed to access the eight coal seams, the plan for an open-cut mine at the Carmichael deposit requires a depth of up to 280 metres, almost double that required for the southern Galilee Basin deposits, reducing the economics of accessing the lower seams.^{boxxiv}

Figure 29: Typical coal quality parameters for the Carmichael Project

Year	ROM Mt O/C	Mt U/G	ROM Mt Total	Mt Product Coal	Yield
2016	5.5		5.5	4.1	
2017	19.0		19.0	14.1	
2018	25.5	2.8	28.3	21.6	
2019	32.5	18.8	51.3	42.9	84%
2020-2024	239.5	99.7	339.2	276.9	82%
2025-2029	270.0	100.8	370.8	300.6	81%
2030-2034	270.0	97.7	367.7	297.5	81%
2035-2039	270.0	94.6	364.6	294.4	81%
2040-2044	270.0	81.2	351.2	281.0	80%
2045-2049	270.0	69.9	339.9	269.7	79%
2050-2054	241.4	34.2	275.6	212.8	77%
2055-2059	162.0	21.9	183.9	137.9	75%
2060-2064	166.5		166.5	123.2	74%
2065-2069	134.1		134.1	92.6	69%
2070-2074	29.2		29.2	21.6	74%
Total	2,405.2	621.6	3,026.8	2,390.9	79%
Average over life	40.1	10.4	50.4	39.8	79%
Average over 2020-2039	52.5	19.6	72.1	58.5	81%

Carmichael Coal Project: Economic and Financial Risks (continued)

7.2: Carmichael Coal Mine and Rail Project approval status

Adani has been developing the Carmichael project since its acquisition in August 2010. However, Adani is yet to finalise its preferred rail route and reach financial close. As at 22 November 2013 Adani Mining released its Supplementary Environmental Impact Statement. The final government approvals are also still outstanding for dredging for the T0 project at Abbot Point – see Section 9.1.

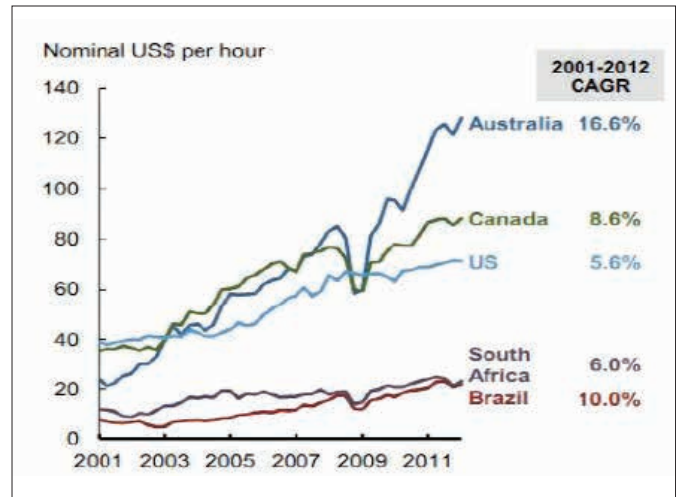
7.3: Australian thermal coal – industry cost structure

The average cost of production for Australian thermal coal increased dramatically between 2006 and 2012 – a recent Westpac presentation at Coaltrans in August 2013 “*Strength of the AUS\$: Impact on competitiveness of Australian coal*” put this estimate at US\$76/t in 2012, a 110% increase from the US\$36/t in 2006, resulting in a massive deterioration in Australian thermal coal’s international competitiveness. The single most significant impact on this is the rise of the AUD. The cost of production of thermal coal rose 53% from A\$48/t in 2006 to A\$73/t by 2012.

Westpac identified the second major driver of the declining international competitiveness of Australian coal as due to the steep rise in Australian mining labour costs – rising over the 2001 to 2012 period at a CAGR of +16.6% – Figure 30. Low unemployment, a skills shortage and harsh conditions in remote locations were all factors driving this increase. Labour currently represents some 50% of new project costs in coal. The AME estimates the average Australian coal mining labour rate in 2012 at US\$122,000 p.a., double that of the US, the largest OECD coal producer.

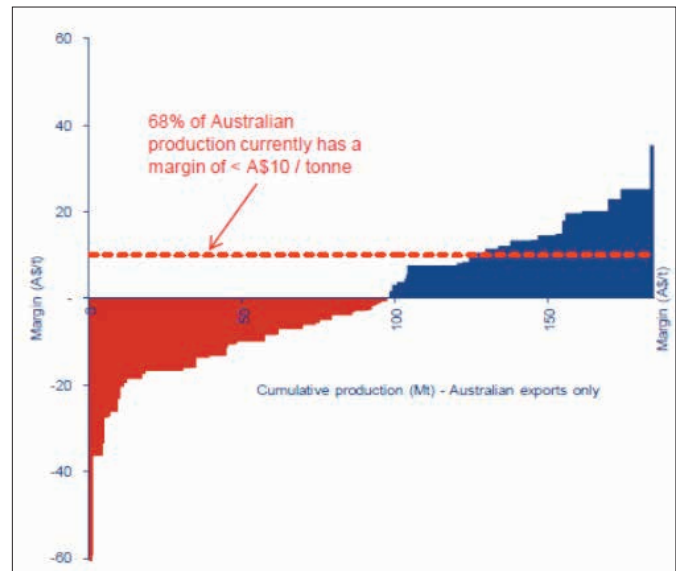
While the AUD/USD exchange rate and Australian mining labour costs have moderated into 2013, the latest available Australian thermal coal cost curve suggests that at the current spot price of US\$79.40/t (Newcastle FOB 6,080kcal), the average thermal coal mine in Australia is operating at a cash breakeven basis – Figure 31.

Figure 30: Increase in Labour Costs Since 2001 – Australia vs Other Coal Nations



Source: ABS, Port Jackson, Wall Street Journal

Figure 31: Australian Thermal Coal Margin Curve (2013)



Source: Wood MacKenzie – 8 August 2013

Carmichael Coal Project: Economic and Financial Risks (continued)

7.4: Carmichael Coal – estimated cash cost of production of US\$84/t

The benchmark thermal coal export price from Newcastle in October 2013 was US\$79.40/t FOB (6,080kcal NAR). Given the lower than benchmark energy content of the Carmichael coal (5,260kcal NAR), we examine the mine cash cost of production on an energy-adjusted basis so it is comparable to the Australian benchmark price for thermal export coal.

Figure 33 details an estimate by Goldman Sachs' Global Mining Research Team of the cash cost of production of two hypothetical Australian thermal coal mines, one with a strip ratio of 6.0 BCM/t of coal, the other at 7:1 BCM/t. The cost structures are calculated on the assumption that the coal will be transported by rail 150km (at the current prevailing rate of A\$0.043/t/km – refer Section 6.2) to the port (with port charges of a standard A\$6/t), pay standard Queensland coal royalties of 7% (Figure 32) and have a ROM-to-net-saleable-coal yield ratio of 70-80%. This generates an energy-adjusted cash cost of A\$78-84/t FOB, which at the current AUD/USD exchange rate of \$0.959/A\$1 gives a cash cost of production of US\$75-81/t. This leaves little, if any, room for profit with a current market price of US\$79.40/t (Newcastle FOB (NAR)).

We note that the Queensland Government's newly released 'Galilee Basin Development Strategy' proposes an as-yet undefined royalty concession in early years for the first mover in the Galilee.^{bookx}

Figure 32: Queensland Government State Coal Royalties

Coal price range	% royalty
A\$0-100/t	7.0%
A\$100-150/t	12.5%
>A\$150/t	15.0%

We have used Goldman Sachs' methodology to estimate the cash cost of production for the Carmichael open-cut mine, working on the key parameter of a 5.8BCM:1t strip ratio. We incorporate a 10% lower cost of overburden removal for Carmichael project, assuming economies of scale and productivity savings are achievable. We have used the new assumption by Adani Mining of a 79% yield on the ROM production rate of 40Mtpa of open cut mining, as referenced in the November 2013 Supplementary Environmental Impact Statement (SEIS). We factor in the A\$2/t royalty owing to Linc Energy (refer Section 1) plus a Queensland Government coal royalty of 7% (acknowledging this may be waived in initial years). For the rail costs of transporting Carmichael coal 400km to the AAPCT, we assume A\$0.039/t/km (a 10% discount to prevailing rates, given the economies of scale should such a project get up and running). This gives a base cash cost of production of A\$71.93/t. We then adjust for energy content of 5,260kcal (NAR) to get a cash cost of A\$87.13/t or US\$83.56/t on an energy adjusted basis (see Fig 33).

This cash cost does not include mine remediation costs or interest expenses.

Adani Mining claimed a cash cost of A\$33/t

We note that Adani Mining provides an estimated cash cost of production of A\$33/t in its now superseded EIS conclusion.^{xci} We acknowledge this is well below our estimate of A\$75.38/t (before adjusting for energy content). The EIS provides no details as to how this is derived, nor gives any context of the estimate.

We assume it is a free on rail (FOR) estimate that excludes:

- the royalties payable to the Queensland Government (7% or A\$5.56/t)
- Linc Energy (\$2/t);
- railway and port charges estimated at a combined A\$21.48/t.

This also could exclude sustaining capital expenditures, as this is referenced in the same section as part of the A\$16.5bn total investment over the life of the mine. As such, the A\$33/t is not far off our A\$40.11/t mine estimate pre-overheads, particularly given the A\$33/t Adani Mining forecast was calculated using a 99% yield, a 50% higher production rate and a significantly lower coal handling and preparation plant (CHPP) processing rate.

Carmichael Coal Project: Economic and Financial Risks (continued)

7.5: Carmichael Coal Mine – project risks

The Carmichael project involves a proposal to build a 40Mtpa ROM greenfield open cut coal mine and a series of underground coal mines of total combined capacity of 10Mtpa in the same deposit. This would give a proposed capacity of 50Mtpa ROM with a yield of 79% to generate 40Mtpa of saleable thermal coal for export from Queensland. In general, the coal is low rank – non-coking, high volatility and high ash content, modestly high in inherent moisture and low in sulphur content with an energy content of 5,400-5,500kcal (GAR), some 15% below the Newcastle benchmark.

In general, the coal is low rank – non-coking, high volatility and high ash content, modestly high in inherent moisture and low in sulphur content with an energy content of 5,400-5,500kcal (GAR), some 15% below the Newcastle benchmark.

The magnitude of this greenfield project is in itself a key project risk – a series of coal mines of this scale have never been built in Australia – not even by experienced operators, let alone by a firm with no experience in Australian mining. Other key risks include the:

1. probability of further timetable and cost blow-outs;
2. ability of the Adani Group to raise sufficient debt and equity finance to achieve financial close;
3. very marginal economics of the project at current thermal coal prices; and
4. remote location of the coal deposit.

We discuss each of these below.

Figure 33: Australian Thermal vs Carmichael Coal Cost of Production for Open Cut Mining

Transport Type	Rail		Australia		Carmichael open-cut
Overburden	A\$/prime BCM		4.30	4.30	3.87
Strip Ratio	Prime BCM/t ROM		6.0	7.0	5.8
Overburden	A\$/t ROM		25.80	30.10	22.64
Mining	A\$/t ROM		4.75	4.75	4.75
Subtotal	A\$/t ROM		30.55	34.85	27.39
CHPP	A\$/t ROM		4.30	4.30	4.30
Yield	t product/t ROM		80%	70%	79%
Subtotal	A\$/t		43.56	55.93	40.11
Sustaining capex	A\$/t		2.85	2.85	2.85
Overheads	A\$/t		3.75	3.75	3.38
FOR	A\$/t		50.16	62.53	46.34
Queensland Govt. Royalty	A\$/t (7% if below A\$100/t)		5.56	5.56	5.56
Linc Energy Royalty	A\$/t				2.00
Distance to Port	km		150	150	400
Transportation rate	A\$/t		0.043	0.043	0.039
Transportation	A\$/t		6.45	6.45	15.48
Port costs	A\$/t		6.00	6.00	6.00
FOB	A\$/t		68.17	80.54	75.38
CV - NAR basis	kcal/kg		5,600	5,800	5,260
Non-CV discount	%		5%	0%	0%
FOB @ 6,080kcal	A\$/t		77.91	84.42	87.13
FOB @ 6,080kcal	US\$/t	\$0.96	74.71	80.96	83.56

Source: Goldman Sachs Global Investment Research "Australia: Metals & Mining", July 2013, with the Carmichael data the authors' extrapolation

Carmichael Coal Project: Economic and Financial Risks (continued)

The risks – Adani Enterprises’ limited coal mining experience

Adani Enterprises has very limited mining experience, having commissioned a single thermal coal mine in Indonesia that is currently producing 4Mtpa. To go from having never operated a mine in Australia to the successful and safe commissioning and ongoing operation for 90 years of the largest coal project in Australian history introduces a myriad of operational, labour and environmental risks.

Adani Enterprises describes its coal mining expertise as follows:

“Adani is developing and operating mines in India, Indonesia and Australia. Extractive capacity is scheduled to increase from 3Mtpa of thermal coal in 2011 to 200Mtpa by 2020, making Adani one of the largest mining groups in the world.”^{xcii}

Adani Enterprises describes its Indian coal mining business as:

“Mine developer and operator with 110Mtpa order book.”^{xciii}

The reality is less substantial than these two company descriptions imply. Adani Enterprises had never operated a coal mine prior to 2008/09 anywhere, and as of the 2012/13 annual report only had a single thermal coal operating commercially in Bunyu, Indonesia, producing 2-4Mtpa over 2010 to 2013. Adani does not rank in the list of major coal producers in Indonesia, let alone in the world.

In 2008/09 Adani Enterprises commenced its thermal coal mining operation at Bunyu in Indonesia with coal production of 1.0Mt. At the time, it was forecast that production would rapidly ramp up to 9.5Mtpa by 2013. However, production has been well short of this target, being 2.2Mt in 2011/12 and 4.0Mt in 2012/13. Bunyu’s poor performance has continued, with production in the six months to September 2013 at 1.53Mt (3Mt annualised), again below guidance of 5-7Mtpa and well below Adani Enterprises medium-term target to increase production to 11Mtpa.

In India, Adani Enterprises 2011 investor presentation^{xcvi} clearly states its Indian mining experience:

“Largest Coal Mine Developer & Operator
... Coal Mining Operations – 130Mtpa”

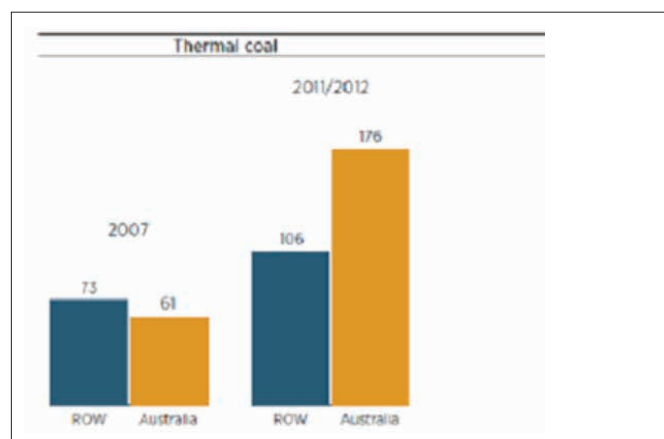
Adani Enterprises’ 2008/09 annual report states Indian coal mining is expected to “start from October 2010.”^{xcvii} However, the May 2013 Adani Enterprises investor presentation states production at only one of the four Indian coal deposits had commenced from January 2013 at an as-yet undisclosed rate of production – with no commercial volume of sales disclosed.^{xcviii}

Adani Enterprises has entered into “Mine Developer & Operator” (MDO) arrangements with state owned entities in these four blocks, under which the ownership of the coal remains with the state owned entity, and Adani functions as the contractor. Environmental clearances for at least one of these deposits is being challenged before the National Green Tribunal – refer Section 9.2.

The risks – capital cost and timetable blow out?

Adani Mining’s EIS submission estimates the Carmichael mine and offsite infrastructure cost at A\$5.9bn, plus another A\$1.2bn for the 190km railway line (Option 2).^{xcix} However, the Australian mining sector has experienced rampant cost inflation. The Minerals Council of Australia, the peak mining industry lobby group, has strongly argued this capital cost blowout risk is putting “opportunity at risk” – Figure 34.

Figure 34: Thermal Coal – Capital Spend to Build a Tonne of New Capacity (US\$/t)



Source: “Minerals Council of Australia, 2012 ‘Opportunity at Risk’”

The Adani Group’s various Australian projects have all witnessed significant timetable slippage or cancellation over the last four years. These projects all face the probability of further capital cost and/or timetable blow-outs.

Carmichael Coal Project: Economic and Financial Risks (continued)

The risks – an uneconomic proposition?

The rapid deterioration in the price of thermal export coal over 2012 and 2013 has left many existing and proposed thermal coal projects in Australia uneconomic. The Australian Coal Association, which represents coal exporting companies, argues that the incentive price for the majority of thermal coal projects is in excess of US\$100/t^{cii} relative to a current Newcastle FOB (NAR) price of US\$79.40/t – Figure 35. At an estimated energy-adjusted cash cost of production of US\$84/t, at current thermal coal prices Adani Mining will be loss-making at a cash level, even before considering a return on its A\$6.4bn of capital investment.

Peabody Energy, the world's largest private sector coal producer, reported in October 2013 that its Australian division's gross margin per tonne of coal sold dropped 68% yoy to US\$8.25/tonne from US\$26.08/tonne the year earlier, despite being a mix of thermal and higher value coking coal.^{ciii} The economics of existing and proposed coal projects has materially declined in the last year.

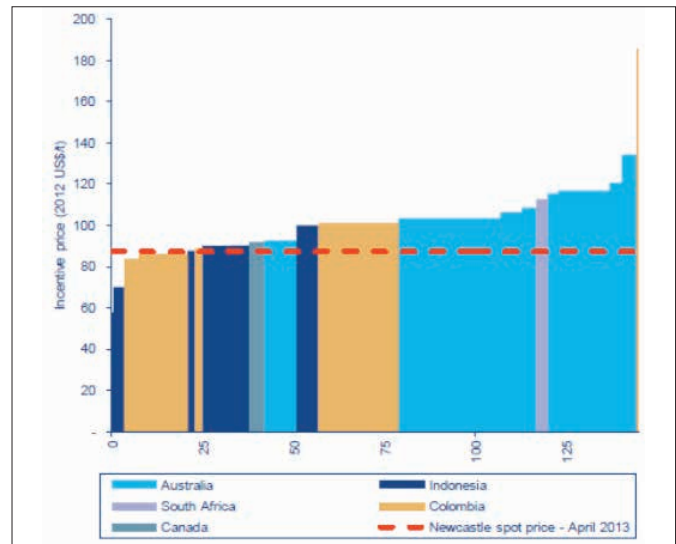
We also note that BHP Billiton's BMA discontinued development of the 14Mtpa Saraji East coking coal proposal in November 2013.^{civ} This is notwithstanding the sunk cost of A\$2.45bn to acquire the project in 2008, its high coking coal value and its location in the Bowen Basin, such that transport infrastructure is already in place.

The current price of domestic coal in India is around US\$30/t. The introduction of a new and substantially sized supply of imported coal costing in the US\$80-100/t range (landed, including Australia-India shipping costs of some US\$15/t) will place upward pressure on electricity utilities' end customer pricing and the Indian economy's ability to sustain coal-fired generation. The Australian prices will be part of the permanent cost structure of coal in India. The risk to Adani Power's India-based generation resources and other power generators in India is clear without significantly higher Indian electricity prices.

The risks – take-or-pay contracts: a major contingent liability

For the Carmichael mine to become operational, Adani Enterprises may have to enter long-term take-or-pay rail and port contracts priced at well above industry norms due to the extreme distance to port. Adani Enterprises may have a long term liability to pay a significant proportion of its A\$620m annual rail freight charge (40Mtpa at A\$15-16/t) to the provider of rail services, irrespective of whether it has actually shipped any thermal coal. As such, if thermal coal prices stay at or below current levels, the Carmichael mine would operate at a cash operating loss – just so it can fund its take-or-pay agreements. The Queensland Resources Council in October 2013 flagged this type of arrangement as a major industry cost, stating *"no relief has been offered on onerous take-or-pay obligations."*^{civ}

Figure 35: Incentive Price for Thermal Coal Projects (15% IRR)



Source: Wood Mackenzie, 8 August 2013

A similar port take-or-pay charge will be required by any banking syndicate to AAPCT T0.

The risks – remote location of the coal deposit

No industrial scale water access within 200km

The Galilee Basin is a low rainfall region that is prone to drought. As such, in order to secure a reliable water supply for the mine, a significant investment in water infrastructure, including new pipelines will be required. It appears that water supply issues have yet to be resolved for the project.

The SEIS prepared by energy and engineering consultants GHD for Adani Mining of November 2013 suggests the Carmichael coal mine would require approximately 12,000 million litres of water per annum.

Originally, Adani stated the preferred source option for the project was the Connors River Dam project. Commissioning of the dam and pipelines was expected by Adani Mining in early 2014^{cvi}, but this A\$1.2-2.0bn project has been put on hold indefinitely by the Queensland Government. Due to this cancellation, in the Carmichael mine EIS, Adani propose sourcing all water for the mine from local sources; extraction from local creeks and rivers plus 17 boreholes. We consider localised water solutions unlikely to be consistently available during any extended drought period.

In November 2013 the Queensland Government proposed supporting the development of localised water solutions, plus providing water allocations and potential supply from the Burdekin Resources Operations Plan at a price to be determined. For the Carmichael mine to deliver 40Mtpa coal consistently over the next

Carmichael Coal Project: Economic and Financial Risks (continued)

60 years, we assume this pipeline or an equivalent source of water external to the region (such as the Connors River Dam) will be required. Localised water solutions are unlikely to be consistently available during any extended drought period.

Until a feasible and reliable supply of water is determined, we see risk to the project's final capital costs.

No industrial power grid within 200km

On a project of 60Mtpa coal, the maximum power required is forecast by Adani Mining to be approximately 200MW. There are no viable electricity transmission lines within 200km of this project capable of providing the power to move billions of tonnes of overburden rock.

In August 2013 Adani Mining's Galilee Transmission Pty Ltd announced a proposal to build a 250km transmission line to link into Powerlink's Strathmore substation at a construction cost of A\$300m. The transmission line is expected to have an initial capacity of 35MW with commissioning due December 2015, subject to all necessary approvals. Adani Mining comments that an expansion of capacity may be undertaken. This will be an open access link and the Director-General of the Department of Energy and Water has issued Galilee Transmission Pty Ltd a Transmission Authority for the Galilee.^{cviii}

No sealed road access

The proposed road access to the mine is 90km of currently unsealed local road off the Gregory Developmental Road. In the first year of construction, Adani Mining expects this unsealed local road to cope with 25,000 trips by mainly heavy vehicles. During and following high rainfall events, unsealed roads in this region may become unpassable to heavy vehicular traffic.

The risks – extreme rainfall events

Climate change is already resulting in more frequent and more intense weather events than have occurred historically. Any proposed mines in the Galilee Basin will be subject to impact from both drought and flood.

In recent years major thermal coal mine flooding has occurred at Ensham, Queensland and Yallourn, Victoria (Figure 36) – costing the mine owners hundreds of millions of dollars in lost productivity and restoration costs. Adani Mining states it is building infrastructure to withstand 1 in 100 year extreme weather events. We suggest with Australia very prone to dramatic climate change impacts, extreme weather events will become increasingly common, and harder to deal with. Having never dealt with these extreme events before, we question how Adani Mining can claim to be suitably prepared to take on these risks.

Since 2008^{cx} Queensland's coal production regions have experienced record floods, in some cases, twice. This is a key vulnerability for the Carmichael project even once it is operational. BHP Billiton BMA in 2013 announced it would introduce new trestles at Hay Point Port to reduce storm vulnerability, with the new trestles over 17 metres above the high tide sea level versus the existing trestles at 12 metres. This 50% increase in the height of the pier would indicatively put Hay Point above the water height of Tropical Cyclone Yasi, whereas previously the benchmark was based on the lower experience of Tropical Cyclone Ului. ^{cx} The benchmark for natural disaster mitigation is being lifted by those operators with decades of on-the-ground-experience.

Figure 36: Yallourn Mine Disaster



Source: Environment Victoria

Carmichael Coal Project: Economic and Financial Risks (continued)

7.6: Carmichael Coal – revisions from the November 2012 EIS to the November 2013 SEIS

This report incorporates a number of major revisions to the key Carmichael Project assumptions as detailed in the November 2013 SEIS relative to that of the November 2012 EIS. These include:

1. The mine life has been shortened from 90 years to 60 years “due to new exploration results”;
2. No change to the target of 60Mtpa of saleable coal in the first 20 years of full production. But where the earlier EIS had saleable coal rising post 2040 to 65Mtpa till 2090, the SEIS has peak production of 60Mtpa for 2020-2040, then stepping down to 35Mtpa by 2055 and then to 22Mtpa from 2060. So rather than being 60Mtpa average over 90 years, the new mine plan is 40Mtpa average over 60 years - a major downgrade on both saleable coal and life of mine. In all, a halving of total saleable coal over the life of the project;
3. The SEIS references a few “editorial errors” in the earlier EIS for the mine plan - as a result the SEIS has a total life of mine yield of 79% - down marginally from the EIS level of 96%;
4. The coal handling and preparation plant (CHPP) will wash 75% of ROM coal (up from 30%);
5. The life of mine capital cost has been reduced from A\$21.5bn to A\$16.5bn, excluding power and water, but including the 190km of West-East rail option. This reflects the lower life, as the total capex includes stay-in-business or maintenance capex covers 60 years rather than 90 years at a much lower level of production;
6. The SEIS shows construction delayed one year to 2014, with operation likewise delayed a year to 2016;
7. The number of employees for the mine during operation is raised from 3,000 to 3,800, plus 120 relating to the West-East rail operation;
8. The average water demand increases 30% to 12,000 million litres per annum; and
9. Total measured, indicated and inferred resource was downgraded 10% to 10.15bn tonnes.

These revisions will each adversely impact the cash cost of production and / or return on investment over the life of this Carmichael Project. In combination, the SEIS revisions reinforce our view that the Carmichael Project is not an economic proposition.

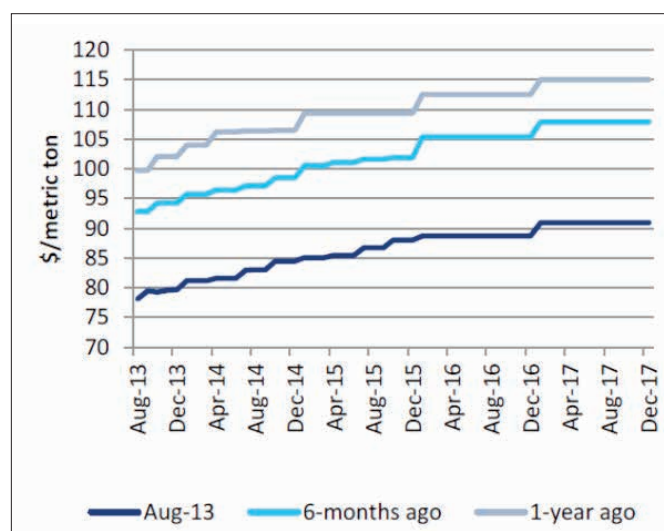
Section 8

Broader Dynamics of Global Coal Prices ... Continuing to Weaken in 2013 and Beyond

8.1 The short and immediate term markets

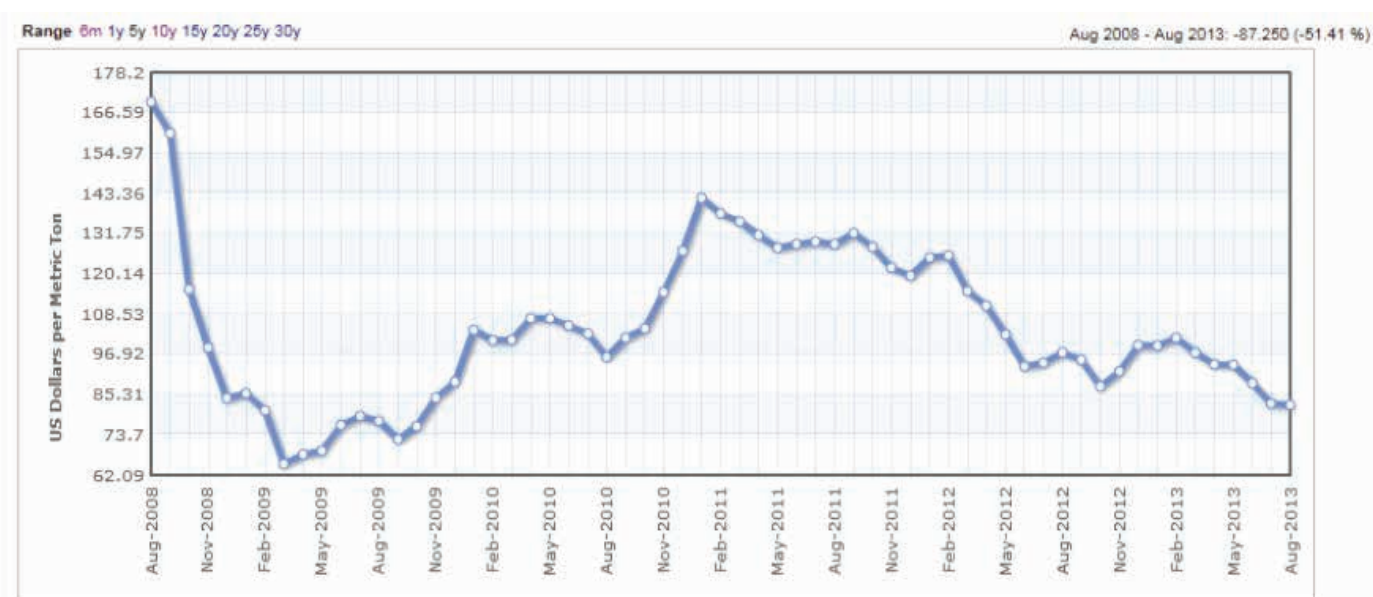
The price of thermal coal has taken a step-change downwards over the last year – dropping over 20% yoy (Figure 37) to be down 45% since the start of 2011 – Figure 38. This reflects a large increase in supply, but also significantly downgraded expectations with respect to China's consumption of coal – driven by increased installation of renewable energy, the prospects for slower economic growth, a significant government response to increased air pollution, significant reductions in the energy intensity of China's gross domestic product (GDP) growth as the economy transforms towards a more service/consumer orientation and continued improvements in mining efficiency within the country – refer Section 8.4. In addition, a reduction in US coal demand as the electricity sector switches towards renewables and natural gas plus tighter emissions regulations continues to erode the global demand outlook for coal.

Figure 37: Thermal Coal – Australian Newcastle Forward Curve (US\$/t)



Source: Bloomberg, Citi Research

Figure 38: Australian Thermal Coal Price (US\$/t)



Description: Thermal coal, 12,000 btu/pound, <1% sulphur, 14% ash, FOB Newcastle, US\$/metric ton

Source: Indexmundi.com[©]

Broader Dynamics of Global Coal Prices ...

Continuing to Weaken in 2013 and Beyond (continued)

The Newcastle 5500kcal NAR ... US\$62/t a more relevant benchmark

The Newcastle 5,500kcal NAR was priced in October 2013 at US\$62.50/t – well over a US\$10/t discount to the traditional Newcastle 6,300kcal GAR (6,080kcal NAR) price of US\$79.40/t. This NAR 5,500kcal standard is probably the better benchmark for coal pricing for the Galilee Basin thermal coal, given the relatively high ash content and the below benchmark energy content. This NAR 5,500kcal price is based on 20% ash content. Adani Mining forecasts it can get the ash content from Carmichael down from 25-30% ROM to 25% on a net blended post-washing basis. The Carmichael coal has an energy content of around 5,260kcal NAR (5,400-5,500kcal, GAR), i.e. below the new lower quality Newcastle 5,500kcal NAR benchmark.

8.2 The longer term outlook for coal production

The decline of the coal era is being forecast by an increasing number of bodies. Bloomberg New Energy Finance in August 2013 stated:

“There seems little doubt that the above powerful long term pressures will ultimately dislodge coal from its dominant role in the global power system. It is likely that a tipping point has already been reached that prevents fresh capital flowing into new unabated coal.”

This statement at first seems totally at odds with the sustained growth in coal production globally over the last three decades, and the acceleration of production in the decade to 2012 – Figure 39.

However, we see global coal demand and hence production peaking by the second half of this decade, and forecast a steady decline thereafter. The declining demand profile evident in Europe and North America is already clear, with tighter air emission targets driving the decommissioning of much of the aging coal-fired power generating capacity in both these regions progressively through to 2020. In September 2013 the US Environmental Protection Agency issued the latest in emission standards showing an ever tightening regulatory framework will continue to make fossil fuel energy sources an increasingly more expensive source of energy.^{cxv}

There has been a long-held view within the more bullish elements of the coal industry that continued growth in demand from Asia would more than offset the decline in the West. However, this view is becoming less tenable as structural shifts in the key global energy markets accelerate.

We would cite two key factors that are increasingly undermining this proposition of continued demand growth for coal in the Asian region. These are the continued rise of renewable capacity and energy efficiency gains. Additionally, the *Energiewende* policy has driven a rapid transformation of the Germany economy in the last decade – proof that a rapid decarbonisation of a major industrial economy is technically and financially feasible.

Should the Carmichael coal project move forward, it will become commercially operational at a time when coal markets are already oversupplied. The likely impacts will be to drive prices in the region down, further undermining the ability of the mine to cover its costs, and weakening the relative position of other mining interests and energy markets more generally.

Figure 39: Global Coal Production – 1982, 1992, 2002, 2012

Million tonne	1982	1992	2002	2012	Change 12 vs '02	Share of total 2012
China	666	1,116	1,550	3,650	135%	46.4%
United States	760	905	993	922	-7%	11.7%
India	135	254	358	606	69%	7.7%
Indonesia	1	22	103	386	274%	4.9%
Russia	n/a	337	256	355	39%	4.5%
Australia	130	229	341	431	27%	5.5%
South Africa	144	174	220	260	18%	3.3%
Germany	500	307	208	196	-6%	2.5%
Rest of World	1,587	1,216	959	1,077	12%	13.7%
Total	3,980	4,519	4,961	7,865	69%	100.0%

Source: BP Statistic Review 2013

Broader Dynamics of Global Coal Prices ... Continuing to Weaken in 2013 and Beyond (continued)

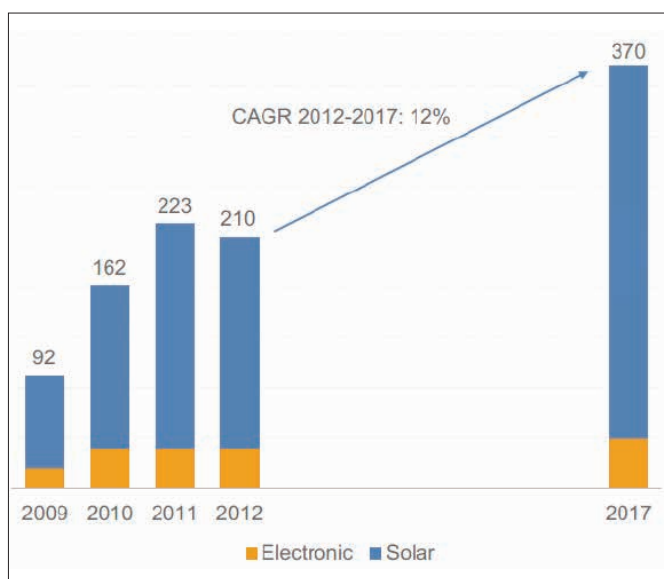
8.3 The continued rise of renewables

Solar power generation continues to see rapid cost reductions driven by economies of scale and technology innovation. This has a growing impact on the profitability and market share of fossil fuel generators. A recent Citi report by Shar Pourreza comments:

“The disruptive effects of solar are evident... its extremely rapid learning curves ... of around 30% over the longer term ... Most disruptively, not only does solar steal share of new electricity demand, it does parasitically steal demand from previously installed capacity, and does [so] at the most valuable ‘peak’ part of the demand curve”^{cxvi}

We forecast global solar installations will reach 38GW in 2013, up 25% yoy, possibly equaling annual wind installations for the first time. In the medium term, we forecast global solar installations to have double digit annual growth to reach 50-60GW annually by 2015-2016. Wacker Chemie AG, a top three global producer of polysilicon for solar photovoltaic modules, forecasts 12% annual volume growth through to 2017, placing its estimate of global solar installations at 70GW per annum by 2017 – Figure 40.

Figure 40: Polysilicon Volume Growth of 12% pa to 2017: Solar at 75GW pa



Source: Wacker Chemie AG, September 2013

When this growth in solar is coupled with the ongoing installation of some 40GW annually of onshore wind, 20-30GW annually of hydro and the newly emerging offshore wind sector adding 5-10GW annually later this decade, this will supplant much of the electricity generating capacity growth that was previously thought could only be supplied by additional coal power capacity.

8.4 China's energy transformation

China's power sector is undergoing a rapid transformation. The ongoing gains in energy efficiency and renewable power generation are advancing well beyond the expectations of most Western forecasts. The Chinese Government's renewed commitment to reducing air pollution will further accelerate the trend away from the use of coal in China. At the same time, large scale investments in infrastructure have seen a significant improvement in rail freight capacity, thereby lowering Chinese coal transport costs and improving their coal self-sufficiency.

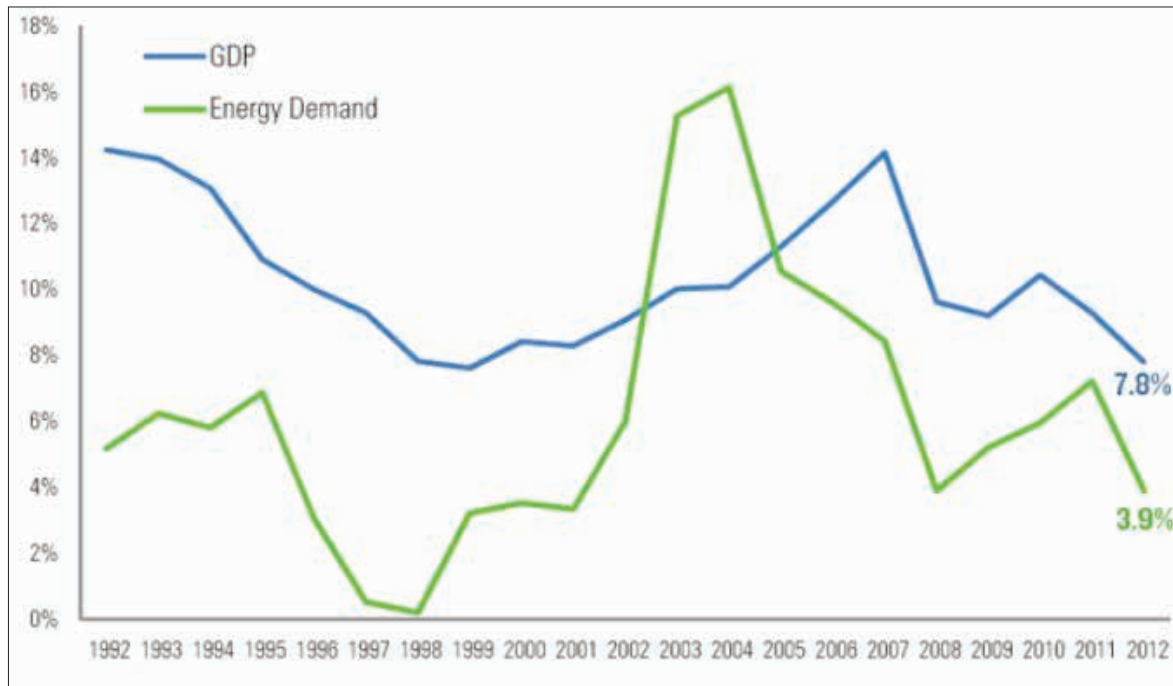
Energy Efficiency ... China leads the way

One of the key assumptions underlying the forecast for growth in Chinese coal consumption is the rate of growth in Asian electricity demand. If real GDP growth in Asia is mid to high single digits, historically forecasters assumed electricity demand would grow at or above this growth rate. For the last decade in China, the ratio of GDP to electricity growth was close to 1:1, but this is biased upwards by the exceptional double-digit electricity growth in 2003-2005. However, looking back over the last two decades electricity demand has grown at half this rate i.e. 0.5: 1 – Figure 41. Given one of the key targets of recent Chinese Five Year Plans has been 3-4% pa gains in energy efficiency, if GDP growth is 7% then energy efficiency can deliver half of the otherwise required growth in electricity. As the Chinese economy transforms away from industrial demand towards more consumer- and service-oriented demand, the natural energy intensity of GDP growth should decline as well.

Broader Dynamics of Global Coal Prices ...

Continuing to Weaken in 2013 and Beyond (continued)

Figure 41: Chinese Economic and Energy Demand Growth 1992-2012



Source: CEIC and RHG estimates

A significant upgrade to China's coal self-sufficiency

“Thermal-coal markets have suffered from a permanent structural shift in China’s domestic coal logistics as rail capacity has finally become self-sufficient.”

Ian Roper, Commodity Strategist, CLSA, August 2013^{cxviii}

Stockbroker CLSA forecasts that China’s improved rail coal logistics and capacity means a significant reduction of China’s thermal coal costs of production (rail is significantly more efficient in scale, and hence lower cost, than road transport). This increases the likelihood that China could effectively cease importing thermal coal beyond 2013 (except for opportunistic purchases at low spot prices).

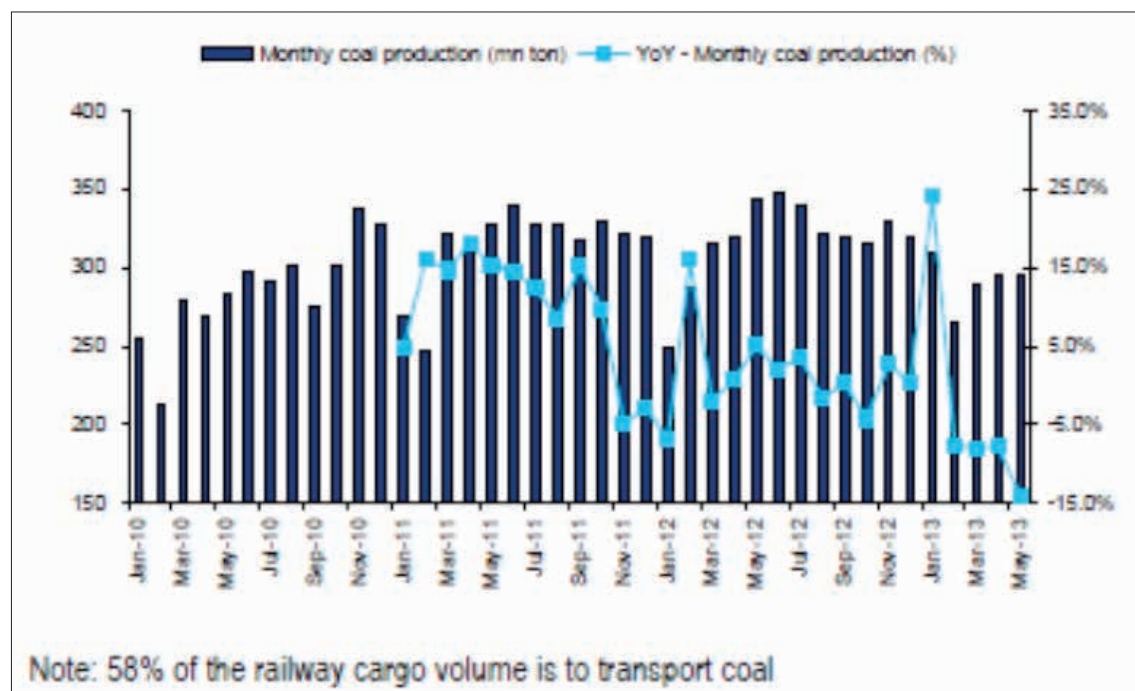
This would transform the global traded coal market, given China has been importing around 20Mt per month over 2012 and year-to-date 2013. China’s domestic coal production was +3.2% yoy in 2012 to 3,120Mt, yet coal usage in power generation actually declined -0.9% yoy, bringing the country closer to a balanced internal supply-demand profile. Total coal consumption in China is +1.4% yoy year-to-date for the first eight months of 2013.^{cxix} Figure 42 details China’s monthly coal production volumes – showing a distinct absence of growth since 2010.

We note there is currently speculation that China is considering scrapping a 10% tariff on exports of thermal coal from 2014, aimed at rebalancing domestic demand-supply.^{cxx}

Broader Dynamics of Global Coal Prices ...

Continuing to Weaken in 2013 and Beyond (continued)

Figure 42: China's monthly coal production volumes and year-year growth rates



Source: CEIC, Citi Research

Airborne Pollution Prevention and Control Action Plan

China's Airborne Pollution Prevention and Control Action Plan (2013-17) will be the second plan in two years to tackle pollution and is backed by 1,700bn yuan (US\$277bn) of investment by the Chinese central government.^{xxxi} Targeting a 25% reduction in air emissions from 2012 levels in north China, the plan includes a targeted 10% reduction in coal usage in this timeframe.

In October 2013 Shanghai announced its Clean Air Action Plan, aiming to reduce the concentration of PM2.5 by 20% by 2017, with a significant focus on stringent emissions controls and other policies that will materially reduce the use of thermal coal in this city of 24 million people.^{xxxi}

China is key to the global thermal coal market outlook

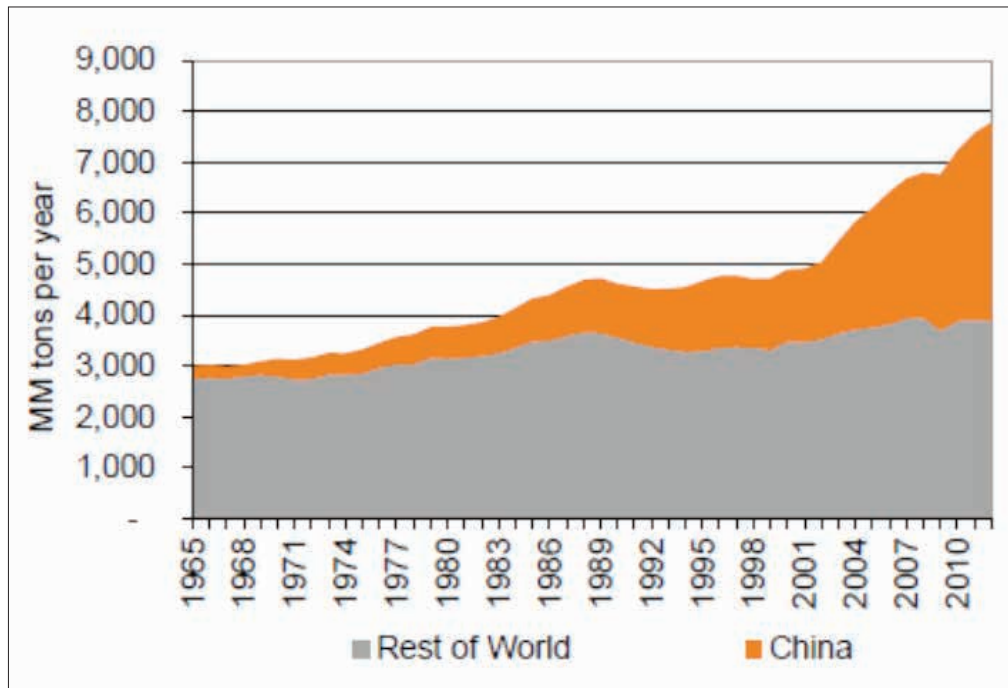
China has risen from less than 10% of global thermal coal consumption in 1965 to over 50% by 2012 – Figure 43. As such, should China manage to deliver on its national target to cap coal consumption by 2017 it would have profound implications for the global coal market.

We believe a global dislocation within the coal industry will occur significantly earlier than most financial and industry participants forecast. The compound effect of the expansion of renewable energy capacity, energy efficiency and a Chinese Government committed to energy self-sufficiency and reduced air pollution make the decline in coal demand inevitable. We forecast Chinese coal-fired power generation will peak in 2016 and decline thereafter – refer Appendix B.

Broader Dynamics of Global Coal Prices ...

Continuing to Weaken in 2013 and Beyond (continued)

Figure 43: Chinese Thermal Coal Demand has Surged to Over 50% of the World's Total Consumption



Source: BP Year Book, Citi Research

8.5 The longer term outlook for coal prices

The thermal coal export market has weakened considerably over the last two years. This has been driven by increased supply from a number of countries combined with lower than expected demand from most importers of coal. One Chinese coal producing major recently stated:

“Thermal coal remains in abundant availability with no significant cuts in production so far; take-or-pay commitments continue to influence Australian producers. Chinese market is weak with strong competition from domestic production and ample stocks... overall the market remains over-supplied.”

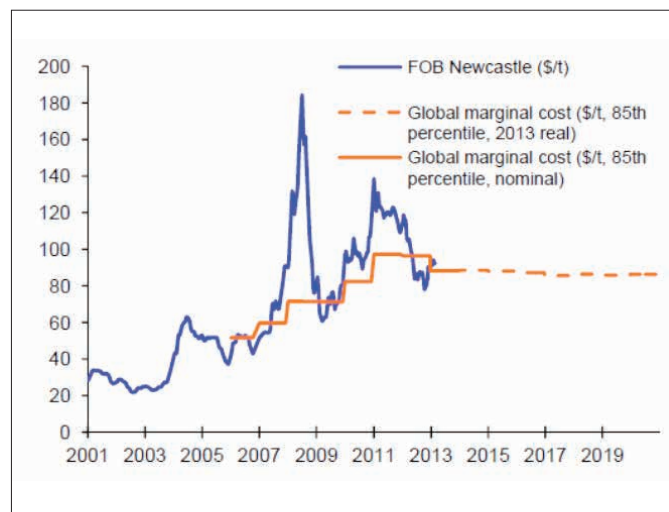
Yancoal Australia presentation, 16 August 2013 ^{cxxiii}

Deutsche Bank's May 2013 report “*Commodities Special Report: Thermal Coal at a Crossroads*” provides a market outlook for coal demand and supply, and hence thermal coal pricing that reflects these new realities. Deutsche forecasts a significant oversupply of thermal coal globally, building progressively through 2020. The conclusion of this is that thermal coal prices are likely to continue to track the global marginal cost curve, as Deutsche Bank's analysis highlights – Figure 44. ^{cxxiv}

Broader Dynamics of Global Coal Prices ...

Continuing to Weaken in 2013 and Beyond (continued)

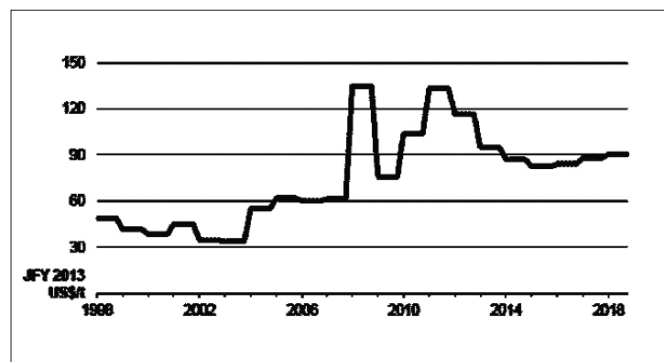
Figure 44: Global Thermal Coal FOB Cash Costs, Real 2013 US\$/t



Source: AME, Deutsche Bank Research

The Australian Bureau of Resources and Energy Economics suggests a similarly subdued outlook – Figure 45.

Figure 45: Japanese Fiscal Year Thermal Coal Prices (Newcastle FOB, US\$/t)



Source: BREE, Resources and Energy Quarterly – September 2013 page 30

A robust global market has in the past driven thermal coal prices above US\$100/t; however, it is unlikely that this price target will be achieved as a permanent part of the global coal market. Consensus projections for the long-term thermal coal price based on the marginal cost of production would challenge the financial viability of Adani Enterprises' Carmichael project given its relatively high cost structure.

Section 9

Environmental and Governance Issues

9.1 Environmental issues in coal mining and related infrastructure in Australia

“Other port projects in Queensland are questionable... Further, increasing activism from environmental groups, farmers’ lobbies, UNESCO and other interest groups are curbing the ability to develop new coal mines and ports in the future. It is Cockatoo’s view that obtaining regulatory approvals for new mine and port developments will become increasingly difficult over coming years.”

Cockatoo Coal’s MD, Andrew Lawson

A key prerequisite for the expansion of the Abbot Point Port is for a major dredging program to be undertaken by North Queensland Bulk Ports Corporation (NQBP) with spoilage to be dumped in the Great Barrier Reef World Heritage Area. In May 2013 NQBP released a Supplementary Report to the Public Environment Report for this dredging project, addressing the 103 submissions from public consultation covering local fishers, tourism groups and the community. NQBP revised its planned site for dumping three million tonnes of sediment, but has yet to disclose its new location. The dredging program is yet to receive Federal environmental approval under the Environment Protection and Biodiversity Conservation Act 1999.

In October 2013 the Federal Environment Minister ordered an inquiry into alleged breaches by AAPCT relating to lack of monitoring of vegetation before it was removed and water toxicity in stormwater return drains.^{cxvii}

9.2 Environmental, Social and Governance Issues for the Adani Group in India

The Adani Group has a very limited operating history in Australia. To gauge its likely business practices, it is relevant to review the Adani Group’s track record in India, where it has been operating for 25 years across a range of activities in the power, infrastructure and port sectors. A number of issues raise concerns:^{cxviii}

2011 – Illegal iron ore transportation and bribery

An investigation by the Karnataka anti-corruption ombudsman (Lokayukta) uncovered that amongst others, Adani Enterprises was actively involved in large scale illegal exports of 5m tonnes of iron ore in 2009/10 resulting in “huge” economic losses to the government. Documents seized from the Adani Group offices indicated the company had been paying cash bribes to officials in the Port Department, Customs, Police, State Pollution Control Board, Weights and Measurement Department and local politicians. These bribes were paid to receive “*undue favour for illegal exports*”.^{cxix} There is litigation pending against several directors of the Adani Group relating to violations of the Customs Act 1962 and evasion of duties.^{cxx}

2011-2012 – Illegal construction

The Gujarat High Court found that Adani Power had illegally constructed an intake channel for its plant at Mundra on private and government land. The Group was ordered to compensate the individual who owned the land.^{cxxi}

2012 – Construction before environmental approval received

The Gujarat High Court found that construction was occurring in Adani Ports’ Mundra SEZ even though the SEZ had not received environmental approval from the central government of India. The Adani Group was found to have contracts with tenants within the SEZ for rent and maintenance charges for infrastructure facilities despite having no permission to build infrastructure in the SEZ.^{cxixii} In April 2013 the Mundra SEZ was found to construct an airstrip and aerodrome without Environmental Clearance.^{cxixiii}

2012 – Deliberately concealing and falsifying material facts

The Adani Group was investigated by the Indian Ministry of Commerce and Industry after prima facie evidence indicated that the company had “*deliberately concealed and falsified material facts*” when applying for a 1,840ha SEZ in Mundra.^{cxixiv} The investigation found that the SEZ did not comply with various required conditions and in October 2012 the government cancelled the SEZ.^{cxixv}

2013 – Fined for environmental damage and violations

Adani Ports commenced commercial operation of its port at Mundra in 2001, and has pursued an aggressive expansion thereafter. This development has come at significant cost, resulting in the destruction of mangroves and severely impacting creeks, mudflats and intertidal areas.

Environmental and Governance Issues (Continued)

In September 2013 a committee set up by the Ministry of Environment and Forests recommended that Adani Ports be fined Rs200 crore (US\$34m) for damaging protected mangroves, creeks and the local environment.^{cxvii} A 2010 inspection found large scale reclamation using dredging material had been carried out on mangrove areas, obstructing tidal flows and large scale destruction of the mangroves in conservation zones.^{cxviii} The Adani Ports prospectus of June 2013^{cxviii} details these committee findings, including:

- diversion and blocking of creeks;
- mismanagement of fly ash from the thermal power plant resulting in emissions and ground water pollution;
- non-compliance with monitoring and reporting conditions;
- failure to gain clearance to undertake construction activity; and
- preventing local fishermen from accessing fishing grounds.

2013 – “Coalgate” and tigers

The Indian Central Bureau of Investigation (CBI) is reviewing a series of irregularities detected by the Auditor General with respect to the allocation of coal deposits to “*leading and influential business houses*” within India. In August 2013 the Indian Supreme Court was informed that most of the relevant files from the Coal Ministry remained untraceable.^{cxix} The CBI in October 2013 widened its investigation to include 85 private companies and has lodged its status report with the Supreme Court of India.^{cx} Adani Enterprises is not one of the groups involved, but the entire captive coal mine allocation process is on hold until the CBI has resolved its investigation.

Adani Power has lobbied hard for years to attain permission to build an open cut coal mine in Maharashtra. The project was rejected in 2009 as it was within the buffer zone of the Tadoba-Andhari Tiger Reserve. The most recent version of the plan would have required the destruction of 1,400 hectares of forest. In 2012 a special committee of Maharashtra forest officials rejected clearance again.^{cxli}

2013 – Coal block cancellation

Adani Enterprises’ “*Lohara coal block was cancelled by Ministry of Environment and Forest (MoEF).*”^{cxlii} This coal block cancellation has been a major impediment to the development of domestic coal for Adani Power’s Tiroda plant, resulting in significant share price underperformance over a sustained period – refer Section 4. The cancellation related to the location of the coal block being in a no-go zone i.e. a wildlife corridor for a tiger reserve. Political uncertainty over the fate of private coal mining operators continues to overhang Adani Enterprises’ other proposed mine developments.

2001-2013 – A range of civil court cases

The June 2013 prospectus for Adani Ports^{cxliii} details 18 groups of civil lawsuits against the company that have been initiated at various times since 2001 and are still outstanding. To detail one of the 18 groups, Adani Ports states that:

“48 land related cases have been filed before various courts against the company on grounds of disputes arising acquisition of land fraudulently or under threat ... illegal construction Illegal encroachment of land.”^{cxliv}

Litigation against Director – violating the Foreign Exchange Regulations Act 1973

Adani Ports has also made public that legal proceedings against a Director are underway for

“investments in a wholly owned subsidiary without prior approval from RBI and remittance of overseas agency commission.”^{cxlv}

This may relate to a 2012 Bloomberg report stating:

“The Ministry of Home Affairs has for more than a year been probing Adani Ports & Special Economic Zone Ltd. (ADSEZ) and the source of money transferred to the company from Mauritius... possible money laundering”.

Adani Ports was reported to have been denied security clearance for a multipurpose facility in Vizhinjam Kerala and a bulk-cargo export terminal in Visakhapatnam.^{cxlvi}

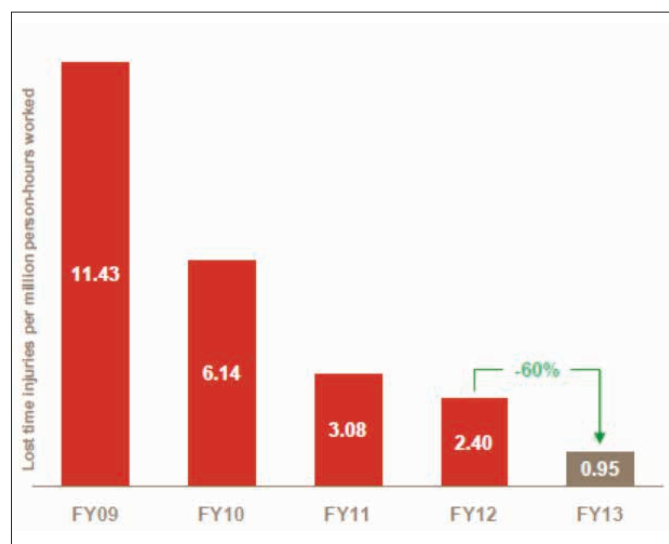
How serious an issue these various litigation proceedings will prove to be is unclear, but the recurring nature does suggest further investigation.

Environmental and Governance Issues (Continued)

Lack of disclosure on safety record

The Adani Group's various Australian presentations refer to a culture of safety, consistent with the Group's stated policy of *"Target Zero Harm and Absolute Compliance"*.^{cxlvii} However, supporting evidence in Adani Enterprises' corporate presentations is largely absent on this subject. Whilst it is standard practice for the leading western mining and rail freight firms to record and present Lost Time Injury Frequency Rates (LTIFR), there is no such reference by Adani Enterprises' senior management. Best practice in corporate governance has the CEO and senior executives focus on LTIFR as a key performance indicator. As Figure 46 details, Aurizon can demonstrate (and consistently discloses) a focus and strongly improving trend: *"At Aurizon, safety is a core value and the Company's number one priority"*.

Figure 46: Aurizon's Lost Time Injury Frequency Rate



Source: Aurizon's 2012/13 full year result presentation

Aurizon also presents a full disclosure of the impact of floods and derailments in terms of costs, customer impacts and consequences. Adani either doesn't incur similar events or, more likely, doesn't consider disclosure of these issues pertinent to its social licence to operate.

9.3 Issues relating to Traditional Owners: Native Title Status Report

Adani's Carmichael Coal Project (the Project) is to be located on an area covered by a registered native title claim made by the Wangan and Jagalingou people (the W&J People). Under the Native Title Act, to secure many of the necessary approvals for the project, including the three mining leases required for the project, Adani must negotiate with the W&J People's

representatives to try to gain their consent to the grant of the approvals (the Native Title Approvals).

In early December 2012, Adani called a meeting of W&J People for the purpose of seeking their authorisation of an Indigenous Land Use Agreement (ILUA) prepared by Adani and without the consent of W&J leaders. The ILUA would have given Adani all of the native title approvals it required to complete the project (other than sections of the rail corridor which fell on neighbouring groups' land). Despite the W&J leaders opposition to the meeting Adani proceeded nonetheless.

At the meeting, the W&J People voted unanimously to reject Adani's proposal. Instead, they voted to authorise an alternative agreement that would require Adani to offer a contract to the group to run the mine camp on commercial terms for the life of the project. The aim of the contract would have been to address chronic unemployment issues within the native title group. Adani has so far rejected this alternative, resulting in a stalemate.

The effect of this rejection and the company's botched handling of the ILUA meeting, has seen a hardening of opposition to the mine within the group, including on grounds of concerns about cultural heritage and the impact of the mine on ancestral lands. This has led some members of the group to open discussions with environmental opponents of the mine.

Adani presently holds Native Title Approval for one of the three mining leases it needs for the Project. It holds none for the associated infrastructure. The lone approval was secured, without the consent of the W&J People, through litigation in the National Native Title Tribunal (NNTT) after negotiations broke down in late 2012.

To secure the remaining two mining leases, Adani must once again negotiate with the W&J People. If negotiation is unsuccessful, Adani may then have a right to apply to the NNTT as it previously did. This can be a slow process, and any determination by the NNTT may itself be subject to appeal to the Federal Court.

Without agreement, and in the case of other aspects of the project such as the proposed rail corridor and accommodation camp, Adani may need to rely upon the State of Queensland undertaking a compulsory acquisition of the W&J People's native title. Compulsory acquisition is a contentious and complex process which can take years to complete. Legal challenges from traditional owners, and others opposed to any compulsory acquisition of their property, should be expected in this event.

Section 10

Australian Projects: Logistics and Delays

The Adani Group has suffered a number of setbacks to each of its various Australian expansion timetables, as outlined below.

Dudgeon Point Port: In its first Australian initiative, the Adani Group in 2009 was selected as one of the two preferred proponents for the development of a 90Mtpa capacity coal export port (over three stages) to service the Galilee and Bowen Basins at Dudgeon Point Port. Stage 1 was to commence operation in 2014. Combined with an equivalent 90Mtpa development by Brookfield Infrastructure Group, this was to be a A\$12bn greenfield project.

However, by June 2013 NQBP's general manager of planning for Hay Point, Bob Brunner, said:

“Because of the downturn in the coal market, a number of new mine developments in the Mackay region have been recently cancelled or deferred”.

The construction start date for the proposed facility has now been put back until late 2015 as a result and staff reassigned, pushing out any commissioning to beyond 2018.^{cxlix} This is similar to Glencore Xstrata's decision to cease development in May 2013 of its proposed A\$1bn 35Mtpa greenfield coal export terminal at Balaclava Island, 40km north of Gladstone, citing:

“The decision has been made as a result of the poor current market conditions in the Australian coal industry, excess port capacity in Queensland, specific shipping limitations and concerns about the industry's medium term outlook.”^{cl}

Carmichael Coal Deposit: In June 2010 Adani acquired the Carmichael deposit. In October 2011 Adani presented plans for 50Mt of overburden removal in 2013 and coal production commencing in 2014.^{cli} In September 2012 Mr Gautam Adani stated *“Our Australian plan is completely on the dot, as per schedule”*.^{clii} However, by December 2012 Mr Adani stated *“production from the mine is likely to start from 2015 and is expected to reach its peak at 60Mtpa by 2022.”*^{cliii} The May 2013 North Galilee Basin Rail proposal from Adani pushed out first coal production to 2016.^{cliv} The State Government announcement in August 2013 relating to Adani Group's

Transmission Authority referenced that Adani had indicated coal production would commence by 2016/17. Given a 3-4 year construction timetable,^{clv} we would suggest 2017 is the earliest date coal could be sold from the Carmichael mine, assuming the railway, power and water lines are constructed by then.

In October 2011 Adani presented its East-West 190km rail link to the Goonyella rail system, stating construction would commence in January 2013 and operations from October 2014.^{clvi} In May 2013 Adani lodged the EIS application for its A\$2.2bn “North Galilee Basin Rail Project” option, which was then opened for public consultation.^{clvii} With a rail construction period of 2-3 years, this means rail access to Carmichael will not be available until 2016 at the earliest.

In May 2012, the Australian head of Adani Enterprises, Mr Jignesh Derasari exited the firm. The press at the time suggested this related to delays in the development of the Carmichael project, although the company cited *“personal reasons”*.^{clviii}

AAPCT T1: When Adani leased Abbot Point Port's T1 in June 2011, the terminal was operating at 35% of its stated 50Mtpa coal export capacity. Adani announced the capacity was fully contracted under take-or-pay contracts.^{clix} To date (latest figures are September 2013), T1 has only operated at a maximum moving annual total of 19Mtpa rate, or 38% utilisation.

Abbot Point T0: In May 2012 Adani detailed its plans for the Abbot Point T0 coal terminal, with Stage 1 at 35Mtpa of capacity, with a Stage 2 expansion to possibly 70Mtpa. This expansion would primarily serve the Carmichael mine, but is proposed to be open to other coal export customers. Adani submitted its draft EIS for the project in February 2013 and its final EIS in June 2013. The project has yet to receive approval by the federal Department of the Environment and a decision is due by 13 December 2013. The latest construction timetable^{clxi} from Adani states construction commencing in Q4 2013 with the terminal's operations targeted to commence in 2016.

Abbot Point T4-7: In October 2011 Adani announced it had submitted an expression of interest for the Abbot Point Terminal T4-7, a 30Mtpa multi-cargo facility.^{clxii} This project was subsequently cancelled.

Clermont Mine: It was reported in September 2013 that Adani Enterprises was one of three bidders for Rio Tinto's 50.1% stake in the 10Mtpa Clermont thermal coal mine in Queensland. However, in October 2013 Rio announced it had finalised a sale to Glencore Xstrata/Sumitomo for US\$1.02bn.^{clxiv}

Australian Projects: Logistics and Delays (continued)

Conclusion

We view Adani Enterprises' development of the Carmichael deposit as an uneconomic proposition. The low energy and high ash content are major constraints to the value of the coal. The remote location and lack of infrastructure will significantly add to the cost of mining and transporting the coal to market. The financial leverage within the Adani Group adds significant financial risk to this project while the lack of relevant management experience in Australian coal mining further raises the operating risk profile. The Adani Group has an excellent ports and logistics business in India; the distraction of a major expansion outside the geographic and product expertise of the Group is likely to continue to erode shareholder value.

Appendix A: Abbreviations and Acronyms

Our terminology	Legal vehicle	Details
AAPCT	Adani Abbot Point Terminal P/L	The Adani family owns AAPCT ("T1"), acquired in March 2013 from Adani Ports.
Abbot Point Coal Port		Abbot Point Port consists of the existing AAPCT T1 facility, plus a multitude of proposed expansions by AAPCT ("T0"), BMA ("T2"), GVK Hancock ("T3") and more recently "T4" by either Aurizon and Lend Lease, or Anglo Coal
Adani Enterprises	Adani Enterprises Limited	The senior listed entity owned 76% by the Adani Group. Adani Enterprises owns 64% of Adani Power and 78% of Adani Ports.
Adani family		The Adani family group of unlisted companies, which together own 76% of Adani Enterprises Limited, as well as Abbot Point Coal Port T1.
Adani Ports	Adani Ports and SEZ Limited	75% owned by Adani Enterprises, Adani Ports is a listed company that is the largest private port owner / operator in India.
Adani Power	Adani Power Limited	The listed entity owning the Adani power stations, as well as owning the Carmichael Deposit.
Adani Mining	Adani Mining Pty Ltd	A 100% owned Australian subsidiary of Adani Global P/L of India, which is in turn 100% owned by Adani Enterprises. Adani Mining owns the Carmichael Thermal Coal Deposit, Central Queensland.
Aurizon	Aurizon Holdings Ltd	The recently privatised and ASX-listed Queensland railway business, 70% focused on transporting coal from the Bowen and Surat Basins to the Queensland ports of Abbot Point, Gladstone and Hay Point.
Carmichael Coal	Adani Mining Pty Ltd	A subsidiary company of Adani Enterprises Limited. Owner of the 'Carmichael Coal Mine and Rail Project'.
Crore		Indian semantic for 10 million in international numerical terms.
EPBC Act		Environment Protection and Biodiversity Conservation Act 1999.
GVK Power	GVK Power & Infrastructure Ltd	A listed Indian conglomerate proposing to develop the Alpha Coal mine and rail project in the Galilee Basin to the south of the Carmichael deposit.
GW	Gigawatt	A measure of electricity capacity, 1GW is 1,000 Megawatts (MW).
Lakh		Indian semantic for 100,000 in international numerical terms.
IPO	Initial public offering	The process of listing a company on the stock exchange, in Adani's case this is usually Bombay Stock Exchange (BSE).
Mtpa		Million tonne per annum
Mundra Port	Mundra Port and SEZ Ltd	Adani Ports and SEZ Ltd changed its name from Mundra Port and SEZ Ltd in Jan 2012.
North Galilee Basin Rail project	Adani Mining Pty Ltd	A proposed greenfield 300km standard gauge railway to Abbot Point Port.
NQBP	North Queensland Bulk Ports Corp.	A Queensland Government owned entity.
QR National Ltd	Aurizon Holdings Ltd	QR National P/L changed its name as Aurizon post its 2011 initial public offering. For consistency, this report refers to this group solely to Aurizon.
RBI	Reserve Bank of India	
ROM	Run-of-mine coal	A term for the gross output of a coal mine. The volume generally falls as the raw product is put through the coal handling and processing plant and washed, plus overburden removed. The net coal output is called product or saleable coal, with the ratio referred to as the mine yield.
SEWPaC		Commonwealth Department of Sustainability, Environment, Water, Population and Communities.

Appendix B: China Electricity Sector – 2010 to 2020F

Fuel Breakdown - PRC

Cummulative Capacity (GW)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2020 %
Coal	683	733	777	814	839	859	869	867	855	838	816	47%
Natural Gas	26	33	39	46	53	61	69	78	88	98	108	6%
Hydro	216	231	246	267	284	301	318	335	352	369	386	22%
Nuclear	11	13	13	17	21	26	32	39	47	55	63	4%
Wind Power - onshore	43	60	73	86	103	120	136	152	167	182	197	11%
Wind Power - off-shore	0	0	0	1	1	3	5	9	13	19	27	2%
Solar Power	1	3	8	17	29	42	57	71	87	103	120	7%
Other (Biomass, EfW, CHP)	4	5	6	7	9	11	13	16	19	23	30	2%
Year End	984	1,077	1,163	1,255	1,338	1,422	1,499	1,567	1,628	1,687	1,747	100%

Fuel Breakdown - PRC

Net Capacity Additions (GW)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Coal	62.2	54.0	44.6	37.0	25.0	20.0	10.0	-2.0	-12.0	-17.0	-22.0
Natural Gas	6.4	6.2	6.0	7.0	7.0	8.0	8.5	9.0	9.5	10.0	10.0
Hydro	19.3	14.5	15.5	21.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
Nuclear	1.7	1.7	0.7	3.2	4.0	5.0	6.0	7.0	8.0	8.0	8.0
Wind Power - onshore	17.0	17.6	12.8	13.2	16.6	16.6	16.5	16.0	15.5	15.0	14.5
Wind Power - off-shore			0.2	0.5	0.5	1.5	2.5	3.5	4.5	6.0	8.3
Solar Power	0.5	2.0	5.0	9.2	11.7	13.5	14.3	14.8	15.4	16.4	16.9
Other (Biomass, EfW, CHP)	1.0	1.0	1.1	1.3	1.6	2.0	2.4	2.8	3.2	3.6	4.0
Year End	108.2	97.0	85.9	92.3	83.4	83.5	77.1	68.0	61.0	58.9	56.6

Fuel Breakdown - PRC

Hours pa operation	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Coal	5,031	5,294	5,135	5,060	5,060	5,080	5,080	5,080	5,080	5,080	5,080
Natural Gas	3,000	3,000	3,000	3,000	3,000	3,000	3,040	3,080	3,120	3,160	3,200
Hydro	3,404	3,028	3,000	3,263	3,263	3,263	3,263	3,204	3,204	3,204	3,210
Nuclear	7,924	7,772	7,772	7,823	7,823	7,823	7,823	7,823	7,823	7,806	7,817
Wind Power - onshore	2,047	1,907	1,840	1,895	1,982	2,000	2,030	2,060	2,090	2,120	2,150
Wind Power - off-shore			3,000	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200
Solar Power	1,400	1,500	1,500	1,500	1,500	1,500	1,520	1,540	1,560	1,580	1,600
Other (Biomass, EfW, CHP)	3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750

Fuel Breakdown - PRC

Hours pa operation	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2020 %
Coal	3,281	3,737	3,878	4,028	4,184	4,315	4,391	4,412	4,376	4,303	4,203	60%
Natural Gas	70	89	107	126	147	170	197	227	258	293	328	5%
Hydro	702	676	715	837	899	955	1,010	1,046	1,101	1,155	1,212	17%
Nuclear	79	91	101	117	145	180	223	274	332	394	457	7%
Wind Power - onshore	70	98	101	121	169	211	249	288	327	367	408	6%
Wind Power - off-shore			0	1	3	6	13	22	35	52	75	1%
Solar Power	1	3	8	19	34	53	75	98	123	150	178	3%
Other (Biomass, EfW, CHP)	13	17	21	25	31	38	46	56	67	80	105	2%
Power production (M MWh)	4,216	4,711	4,930	5,274	5,612	5,928	6,204	6,423	6,620	6,792	6,966	100%
Electricity Output Growth *	15.1%	11.7%	4.7%	7.0%	6.4%	5.6%	4.7%	3.5%	3.1%	2.6%	2.6%	
GDP Growth	10.3%	9.2%	7.5%	7.5%	7.3%	7.0%	6.7%	6.4%	6.0%	5.6%	5.1%	
Electricity Output vs GDP Growth *	1.47	1.28	0.62	0.93	0.89	0.81	0.70	0.56	0.52	0.47	0.50	

* Net of energy efficiency gains of 3% pa or 16% over the 2015 vs end 2010 levels (12th Five Year Plan)

Source: Authors' estimates

Appendix C: Adani Enterprises Ltd

- Top 35 Shareholder listing

	Investor Name	Current Position	% of total
1	S B Adani Family Trust	621,197,910	56.48
2	Adani Properties Pvt. Ltd.	99,491,719	9.05
3	Adani (Vinod Shantilal)	90,749,100	8.25
4	Janus Capital Management LLC	26,061,085	2.37
5	Capital International, Inc.	16,387,800	1.49
6	Elara Capital Plc	16,081,880	1.46
7	HSBC Global Asset Management (India) Private Ltd	15,801,251	1.44
8	M. M. Warburg Bank (Schweiz) AG	14,701,610	1.34
9	Gudami International Pte. Ltd.	13,980,900	1.27
10	HSZ (Hong Kong) Limited	13,636,973	1.24
11	Citigroup Inc	11,494,969	1.05
12	Gautam S Adani Family Trust	8,836,750	0.8
13	The Vanguard Group, Inc.	7,479,140	0.68
14	Dimensional Fund Advisors, LP	3,740,318	0.34
15	BlackRock Institutional Trust Company, N.A.	2,448,034	0.22
16	T. Rowe Price Associates, Inc.	1,017,705	0.09
17	Mellon Capital Management Corporation	923,649	0.08
18	Parametric Portfolio Associates LLC	794,900	0.07
19	Jupiter Asset Management Ltd.	735,000	0.07
20	Shah (Rakesh R)	611,080	0.06
21	Lyxor Asset Management	608,374	0.06
22	BlackRock (Singapore) Limited	566,367	0.05
23	CPP Investment Board	561,000	0.05
24	Birla Sun Life Asset Management Company Ltd.	545,884	0.05
25	Caisse de Depot et Placement du Quebec	495,116	0.05
26	TIAA-CREF	298,832	0.03
27	DB Platinum Advisors	202,721	0.02
28	Shah (Priti R)	196,000	0.02
29	Pictet Asset Management Ltd.	195,308	0.02
30	KBC Fund Management Limited	177,869	0.02

Source: Thomson Reuters Analytics, downloaded 7 October 2013.

Appendix D: Adani Abbot Point Terminal P/L - Banking Syndicate

As of 31 March 2012, the banking syndicate to AAPT P/L consisted of:	
Commonwealth Bank of Australia	298.4
National Bank of Australia	222.7
Westpac Banking Corp.	200.4
The Bank of Tokyo-Mitsubishi UFJ	133.6
Mizuho Corporate Bank	89.1
Standard Chartered Bank	89.1
OCBC Bank Singapore	66.8
Total loan facility (A\$m) (1)	1,100.0
Loan facility - State Bank of India (US\$m)	800.0

(1) Interest on this A\$ denominated loan was BBSY +2.75%.

The loans are repayable over the September 2014 to March 2017 period.

Sources: Adani Abbot Point Terminal P/L filing with ASIC 31 July 2012, Adani Enterprises Limited Annual Report 2012/13 page 158.

The June 2013 Adani Ports prospectus (page 33) details that as of 31 March 2013, the AUD loan facility had been extended in size to A\$1,250m (drawn to A\$1,140m) with an extended five years to maturity. The US\$800m loan from State Bank of India as at 31 March 2013 was reported to have a term of seven years.

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All equity market capitalisation and performance numbers are based on the prevailing share prices and currency rates as at 27 October 2013, which were:

• Adani Enterprises Ltd	Rs194
• Adani Ports & SEZ Ltd	Rs144
• Adani Power Ltd	Rs33.45
• Rupee to USD	61.45:1
• USD to AUD	0.959:1
• Thermal coal price Oct 2013	US\$79.40 Newcastle Spot (NAR, 6,080kcal)
• Thermal coal price Oct 2013	US\$62.50 Newcastle Spot (NAR, 5,500kcal)

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