



BRIEFING NOTE

THERMAL COAL OUTLOOK

May 15 2014



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IEEFA BRIEFING NOTE- INDIAN POWER PRICES

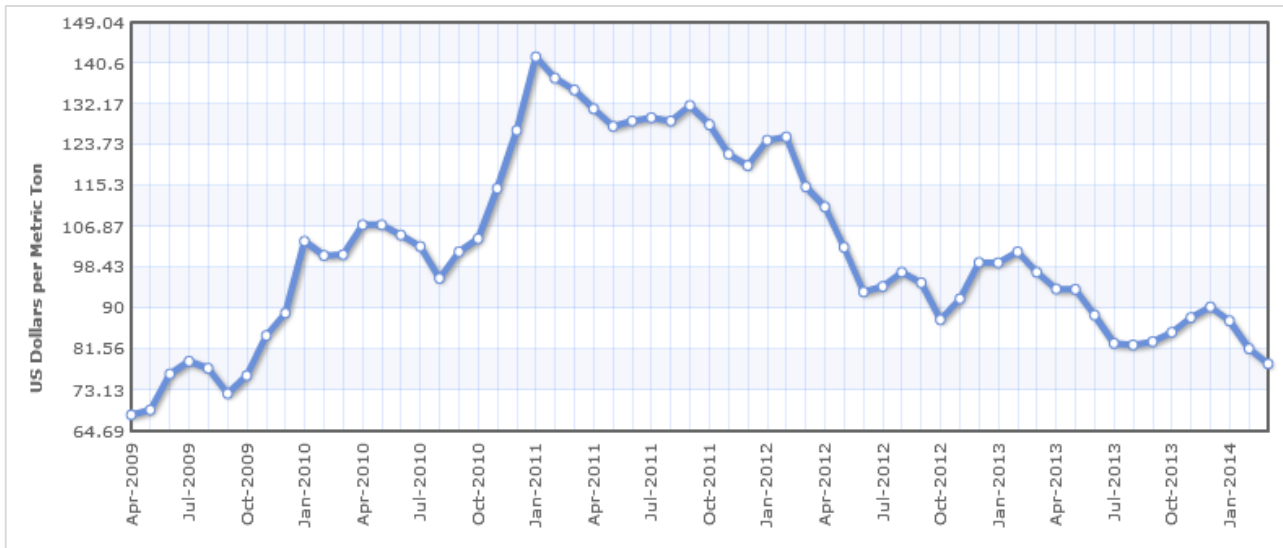
MAY 2014

In this briefing paper, the Institute for Energy Economics and Financial Analysis (IEEFA) provides a summary of recent global thermal coal trends that impact the Australian coal industry. The A\$ has strengthened against the US\$, compounding the continued decline in the coal price to US\$73/t. The coal price weakness leaves the average Australian mine at cash breakeven. This reflects both excess supply and lower than expected demand profiles, particularly in China. We question if India can afford to be the seaborne coal import growth market that consensus expects. Meanwhile, install rates of solar and wind are forecast to grow a combined 90GW globally in 2014.

Executive Summary

- Thermal coal prices are down 22% year-on-year to a four year low of US\$73/t in May 2014.
- At US\$0.94, the AUD is providing a less than expected cushion for Australian producers to falling US\$ commodity prices.
- Some major Australian greenfield mine, rail and port capacity proposals have been shelved in the last year. Most prominent of these are: Glencore's 22Mtpa Wandoan thermal coal mine and associated rail proposal in the Surat Basin (Sept'2013); Dudgeon Point coal export terminal, 180Mtpa (Jun'2013); Lend Lease Abbot Point port AP-X (Feb'2014); Anglo-American Abbot Point port AP-X (Mar'2014); WICET stage 2, 32Mtpa (deferred).
- Take-or-pay (ToP) contracts remain a key impediment to both the Australian and American coal industry's need for export supply curtailment. Some new mine developments continue to progress due to the long term contingent liabilities of these ToP rail and port contracts.
- Some of the largest proposed coal proposals still continue to along the development proposal path – albeit with financial close being pushed out.
- In Queensland, most prominent of these are: Adani's 40Mtpa Carmichael mine, plus associated rail and port proposals; GVK's 30Mtpa Alpha, 24Mtpa Alpha West and 30Mtpa Kevin's Corner thermal coal mines, plus rail and port proposals; Waratah Coal's 80Mtpa Galilee Coal and Alpha North, plus its 120Mtpa rail and 50Mtpa Abbot Point T2 coal export terminal proposals; Springsure Creek \$700m, 6Mtpa thermal coal mine in the Bowen Basin; and Cockatoo's Baralaba 3.5Mtpa PCI coal mine.
- In NSW, BHP's greenfield 10Mtpa Carroona underground thermal coal mine continues through planning, with construction due to commence in 2018.
- Whitehaven's 10Mtpa greenfield Maules Creek, NSW thermal and coking coal mine construction continues, despite major objections and the ICAC corruption inquiries.
- Glencore's US\$1.4bn 8Mtpa Ravensworth North thermal / semi-soft coking project is ramping up over 2014 as is its US\$1.2bn 8Mtpa Ulan West thermal coal brownfields expansion. Glencore's Rolleston expansion to 17Mtpa is ramping up into 2016 due to ToP obligations.

Benchmark Australian Thermal Coal hits four year low of US\$73/t in May 2014ⁱ



Source: <http://www.indexmundi.com/commodities/?commodity=coal-australian&months=60>

Thermal Coal Prices

Prices rallied 10% in 4QY2013 to US\$90/t from a low of US\$82/t in Aug'2013, but have since fallen back to ~US\$73/t by May'2014. Most broker forecasts for 2014-15 range from US\$70-85/t, with a steady stream of downgrades to longer term forecasts to-date in 2014. Capital Economics is the low of those we reviewed, forecasting US\$70/t in 2015 and then US\$65/t in 2016. This forecast for a further decline into 2016 is definitely contrary to the consensus range of US\$85-99/t.

Bernstein's Equity analyst Michael Parker makes a bold statement: "Rather, the expectation of energy deflation may be enough. If the downward sloping forward curve is ever accepted as permanent, rational behaviour from energy producers will guarantee it is so."ⁱⁱ While the forecast suggesting coal's decline is interesting, the logic that renewables are a deflationary force is in our view very contrary to current energy economics thinking.

Citi Equity Research makes a similarly strong forecast: "Thermal coal is facing twin challenges of cyclically strong supply growth and a structural decline in demand growth."ⁱⁱⁱ

Wesfarmers announced in May'2014 that coking coal export prices would be down 16% in the Jun'2014 quarter vs that realised in the Mar'2014 quarter.^{iv}

Cash breakeven for Australian coal

Australian coal exploration company Stanmore Coal estimates that 40% of global seaborne-traded thermal coal production and 45% of internationally traded coking coal production is "unprofitable at current pricing levels," it said in a presentation. Stanmore Coal based its assertion on an analysis of separate production cost curves for seaborne-traded thermal and coking coal and on a present-day spot price of \$113/mt FOB for coking coal and \$73/mt FOB for Newcastle thermal coal.^v

The exchange rate for AUD vs USD (US\$0.94): Down 12% in two years^{vi}



Source: <https://au.finance.yahoo.com/?p=finance.yahoo.com>

The exchange rate

Most Australian miners had hoped that the AUD currency depreciation over 2014 would help soften the profit impact of lower US\$ thermal coal prices. However, the decline in the AUD/USD into the end of 2013 has reversed to-date in 2014. The AUD is down 12% over the last two years, providing very little cushion to the 35% decline in US\$ thermal coal prices.

The Galilee Basin

Despite continued government approvals for the multitude of mining, rail and port developments of Adani, GVK and Waratah Coal, the financial close for these projects keeps getting deferred. Adani in May'2014 was reported as warning its Carmichael proposal would now not expect to see final approval till 2Q2015:

"The state approval for the Carmichael mine and rail project has been released by the government of Queensland today and paves the way for subsequent approvals, including a mining lease, by the third quarter of 2015."^{vii}

Both Indian firms report rising indebtedness and continued losses in their 3QFY2013/14. The approval for dumping of dredge materials in the reef created significant public controversy, with dredging now due 2QCY2015. The media reports both GVK and Adani continue to seek equity partners to support the financing of these projects,^{viii} to-date with no success after Coal India Ltd was reported to have rebuffed the approach given the uncommercial state:

Coal India Ltd "spurned the proposal because of risks related to project implementation, the strengthening A\$, weakening markets and the high cost of production"^{ix}

Given a new 3Mtpa ToP obligation at WICET, Cockatoo Coal has been forced to undertake a highly dilutive equity raising to underwrite its 3.5Mtpa Baralaba coking coal project. CEO Andrew Lawson's^x end Apr'2014 summary of the situation is clear:

"Costs are sticky, and right now most miners are under water. Funding virtually non-existent for new entrants. Community activism will provide a real curb on the timeliness of new greenfield coal developments. Ports are the key – after WICET Stage 1, there is little else that is realistic for this decade."

Bandanna Energy's Take-or-Pay liabilities

Bandanna's 2013/14 interim result^{xi} states the financial consequences to their 'going concern' profile of their long dated ToP rail and port obligations:

*"Securing equity and debt funding for development of the Springsure Creek Coal Project is considered a likely development of the Group with the grant of MLA 70486. If the likely developments in the operations of the Group are not realised during 2014, the ability of the Group to continue to adopt **the going concern assumption will depend upon the ongoing support of financiers and/or a delay in the commencement of the Take or Pay commitments.**"*

Glencore's Take-or-Pay view

Glencore has an 11Mtpa take-or-pay on the peak-cycle Wiggins Island Coal Export Terminal that it has not been able to reallocate on to other miners. The Rolleston Phase I and Phase II expansions to 17Mtpa in part reflects this obligation.

"There are some companies underwater where they should potentially cut back production, but the loss on their producing and exporting is lower than the mines that they'd have to pay on the ToP. So that's keeping a bit of tonnes on the market that really should come out".^{xii}

Cloud Peak (US) Take-or-Pay

In its 1QCY2014 analyst briefing, Cloud Peak Energy Inc. CEO admitted it is now locked into long term take-or-pay rail and port contracts that require a Newcastle thermal price equivalent of US\$85/t, such that Cloud Peak will be losing over US\$10/t its US thermal coal export business. Arch Coal has confirmed its US export losses will be similar at US\$50m in CY2014.^{xiii}

The shrinking demand profile for thermal coal

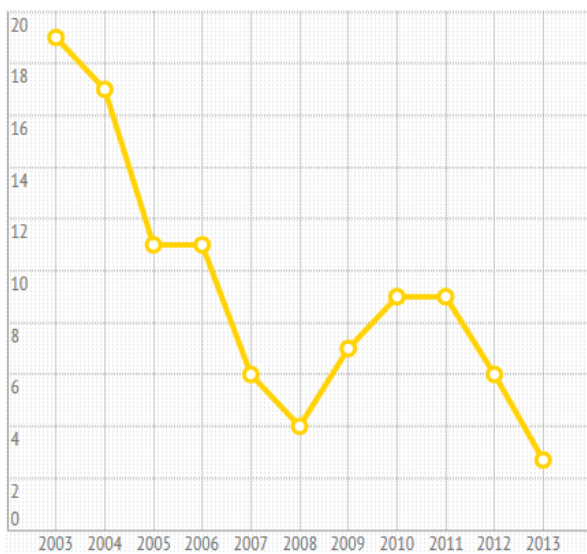
China

Central economic planner the National Development and Reform Commission has forecast that China's coal consumption growth will slow to 1.6% in 2014, down from 2.6% growth in 2013, which is a huge slowdown relative to the 10% pa growth seen in China's coal demand last decade. China added nearly 40% less coal- and gas-fired power capacity in the first quarter 2014 than it did a year ago mainly due to stronger pollution controls and slower economic growth.^{xiv}

Why is this so important? China produces 46% and consumes half the world's thermal coal.

China Coal Energy's 1QCY2014 result included an 8% year-on-year decline in coal production costs from CNY 216 per ton in 2013 to CNY 203 per ton in 2014, buoyed by significant cost savings from significantly enhanced domestic rail transport access.^{xv} China's domestic coal industry's increasing cost competitiveness and flexibility will undermine China's imports of seaborne coal, despite the rapid price declines over 2014.

Annual yearly percent increase in Chinese coal consumption^{xvi}



Source: BP statistical review, Chinese preliminary data, Platts

On our forecasts, China's total coal consumption will slow further, peaking 2016 and actually declining from 2017. This is predicated on continued improvements in energy efficiency, plus huge installs over 2014-2018 of hydro (18GW pa), solar (12-16GW), wind (15-20GW), gas (6-7GW) and nuclear (5GW).

The other key driver is the economic transformation of China. ANZ's Chief Executive Officer Mike Smith forecasts China's GDP growth would slow to say 7% in 2014, with "Greater reliance on services will support consumer demand and also allow China to move to a more sustainable growth trajectory and away from resource and pollution-intensive activities..."^{xvii}

Lower growth with a lower energy intensity lowers coal demand.

India cannot afford imported Australian coal

In May 2014 IEEFA released a new report titled "India Power Prices".^{xviii} This financial analysis examines the cost of electricity generation from imported coal. The conclusion is that for a new greenfield power plant, imported coal would cost Rs5.40-5.70/kWh and rise 4% pa thereafter, whereas wind would cost Rs4.60/kWh and solar Rs5.50/kWh, with no inflation impact over time – making this a straight commercial decision for India to aggressively expand its investment in renewables. Additional benefits include: energy security; energy system

diversity; reduced pressures on the massive current account deficit and hence exchange rate; plus the deflationary angles only reinforce this commercial decision. We view this as highly likely to increasingly undermine the to-date strong growth in seaborne thermal coal demand from India.

US coal fired capacity continues to fall

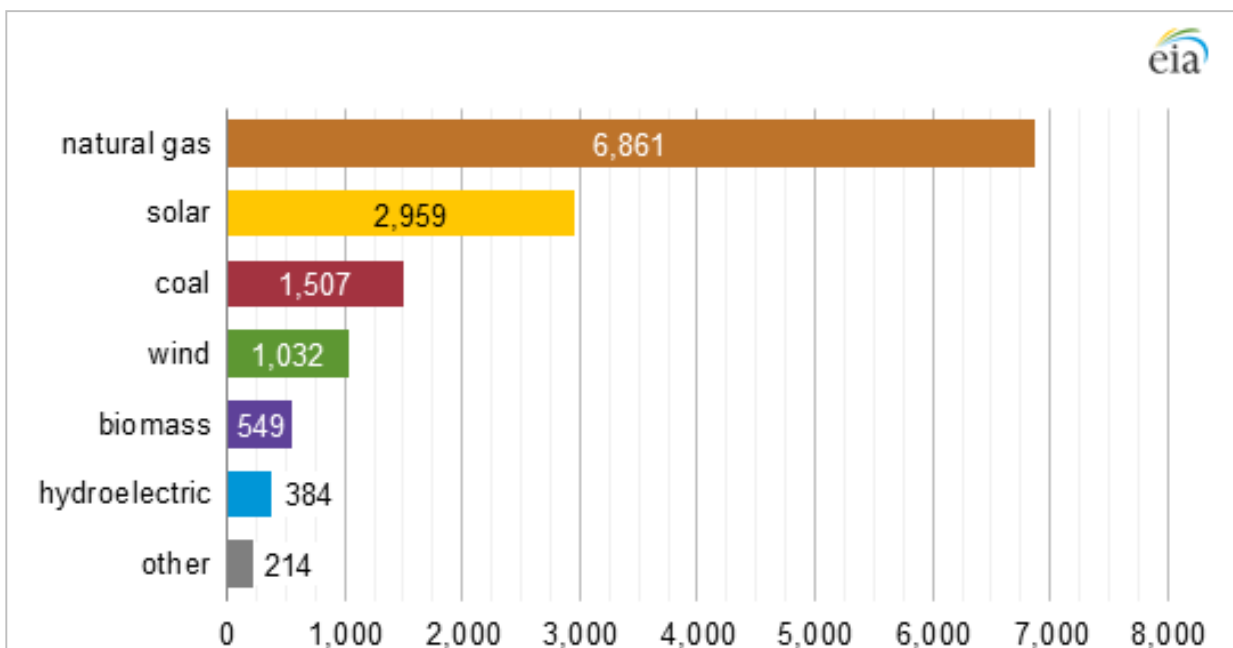
The 165th coal power plant planned closure since 2010 was announced on 2 May 2014 due to the **Mercury and Air Toxics Standards** implantation plus the **Cross-State Air Pollution Rule**.^{xxix} NV Energy filed plans to retire and replace the 557MW Reid Gardner coal plant in Nevada, the majority of which was commissioned 40-50 years ago. NV Energy will also end a 250MW supply contract with the Navajo coal plant. NV Energy is required to build at least 350 MW of new renewable energy projects as part of the replacement plan.^{xxx} Domestic coal demand is permanently exiting the US market.

The EIA (2014) forecasts 51GW of US coal plant retirements (net) from 2012-2025.^{xxxi} Citi Equity Research forecasts 61GW to exit. Sierra Club forecasts 100GW or 30% will retire over 2012-2020.

Despite higher natural gas prices and strong economic growth, US year-to-date coal production totaled 332Mmst, 0.4% lower than the comparable year-to-date coal production in 2013.^{xxii} US domestic coal consumption in 2013 of 925Mst was 18% lower than its 2007 peak of 1,128Mst.

The chart below details the capacity additions to the US electricity system in 2013. Low natural gas prices are key, as is the aggressive state **renewable portfolio standards** and continued impact of the Federal **investment tax credits** in promoting renewable energy. The 2.9GW of solar included 766MW of solar thermal, more than doubling the US solar thermal capacity installed base.

US Power Plant Capacity Additions in 2013 (MW)



Source: EIA April 2014^{xxiii}

The EIA (2014) reference case has non-hydro renewables electricity production in the US rising from 250TWh in 2012 to 380TWh by 2020, with strong growth in each of wind, solar and biomass co-firing capacity. However, given this assumes only 1.3GW of solar and 1.3GW pa of wind are each added over 2012-2025 in the US, this forecast looks likely to be exceptionally conservative. By comparison, the US installed 7GW pa of wind in 2011-2013 (despite only 1GW in 2013 vs 12.9GW in 2012), a rate we expect to be maintained over 2014-2016, and we forecast 5GW pa of solar adds in 2013-2016. Hydroelectricity is forecast to remain constant at 290TWh pa.

Renewable Energy Trends

First Solar continues to drive solar costs down with technology enhancements

First Solar's 1QCY2014 result presentation in May 2014 highlighted the ongoing drive to dramatically boost solar's competitiveness. First Solar targets a thin-film module conversion efficiency of 18-20% by 2017 (having already achieved an independently certified module at 17.0% in 1Q2014), relative to the 12% averaged in 2012. In 1QCY2014, First Solar's best line averaged 14.2%, up 30 basis points (bps) on the Dec'2013 quarter, and up 120bps year-on-year.^{xxiv} With a solar project pipeline of 12.2GW, First Solar's widening geographic penetration continues. First Solar announced one of the largest to-date Middle East solar projects in the quarter, the 53MW Shams Ma'an project in Jordan. First Solar also announced it expects to finalise its first solar-diesel PV hybrid project, a 5MW system at an Australian mining site.^{xxv}

First Solar remains ahead of its Five Year Plan to drive fully installed utility system costs down from US\$1.59/w in 2013 to US\$0.99/w by 2017 (CAGR of -11%). Any suggestion that solar won't continue to rapidly erode traditional coal-fired power generation markets ignores the evidence. The logical extension of this is that deflation in the global electricity market becomes a given.

IEEFA forecasts global solar installs to exceed 45GW in 2014, up 15% from the 39GW in 2013. Combined with 2014 wind farm installations of 46GW up 35% yoy from the 34GW in 2013 due to a surge in installations in China, the US and Brazil.

Japan's solar hit to coal imports

In 2013 Japan installed 7GW of solar, up 200% on the 2.5GW installed in 2012. IEEFA forecasts 2014 installs in Japan of over 8GW, given the very generous Feed-in Tariffs (FIT) of US\$0.32/kWh on offer for 2014/15 (down 11% year-on-year). Assuming the FIT is cut by ~10% pa over the next five years and then is held steady, we would expect Japan's solar installs to continue to run at 8GW annually through to 2020. This represents total new solar capacity additions of 63GW over 2013-2020. With an average solar capacity utilisation of 15%, this translates into additional electricity production of 83TWh annually by 2020. Assuming this cuts LNG and coal capacity equally, this equates to the loss of 42TWh of coal demand, equal to a decline of 20Mtpa (-2% CAGR). Solar alone is likely to cut Japan's total thermal coal imports of 137Mt in 2013 by 15% by 2020. Combined with further energy efficiency gains and declining GDP-related electricity demand is likely to see Japan's coal imports fall by 20% by 2020. Consensus has Japan's coal

demand increasing around +1% pa. We would put a high probability on almost all of the 3.4GW of discussed new Japanese coal-fired power capacity never being built.

Offshore Wind in Europe

Even with the engineering feasibility now proven at commercial scale, offshore wind deployment remains unviable to-date for any country with significant domestic fossil fuel reserves. By the end of 2013, 6.5GW of offshore wind has been deployed. The UK has 56% of global installs (3.7GW in total), followed by Denmark (1.3GW), Belgium (0.6GW) and Germany (0.5GW).^{xxvi}

With a 60% European market share, Siemens targets a 40% reduction in offshore wind's cost of energy of €0.10/kWh by 2020.^{xxvii} For countries like the UK, France and Germany that are reliant on expensive imported gas and coal, and / or nuclear – offshore wind is increasingly a new electricity source of choice.

In May'2014 French utility GDF Suez, Portugal's EDP Renewables and Areva won a 1.0 GW French government tender for €4bn.^{xxviii} The 1,000 MW of wind farms will use Areva's 8-MW turbines, double the average 4.3MW offshore wind turbine size commissioned in 2013 and treble that used in 2011-12. Construction activities are planned to take place from 2019 with commissioning by 2021. As of 1Q2014, there were 22 GW of consented offshore wind farms in Europe and future plans totaling 133 GW.

The addition of 22GW of offshore wind at a 45% capacity utilisation rate will provide 85TWh of additional zero carbon electricity production annually in Europe within the next decade. China has plans to add 30GW by 2020,^{xxix} although China is taking a pragmatic approach to getting the technology and costs right before scaling up its install rates. We see China adding 20GW pa of hydro through to 2020, and thereafter rapidly scaling up offshore wind capacity as all commercial domestic hydro developments are tapped out. Korea and Japan are likewise investing heavily in research, development and deployment of domestic offshore wind capacity.

We note these trends in solar and offshore wind to illustrate that renewable energy will continue to add zero marginal cost electricity supply and hence massively erode coal's traditional baseload role – be that onshore wind and hydro, plus the increasing role of utility scale and distributed rooftop solar, and beyond 2020 that of massive offshore wind projects. Seaborne coal and LNG market segments will be hardest hit, given their significant transportation costs and negative current account implications, almost irrespective of the still largely uncostered externalities of air pollution, climate change, water scarcity and health issues that governments will inevitably have deal with.

German renewables contribution continues to rise

Germany's output of renewable energy in 1QCY2014 rose 12.6% year-on-year to 40.2 TWh, representing a 27% share of total production (up 4% yoy).^{xxx}

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