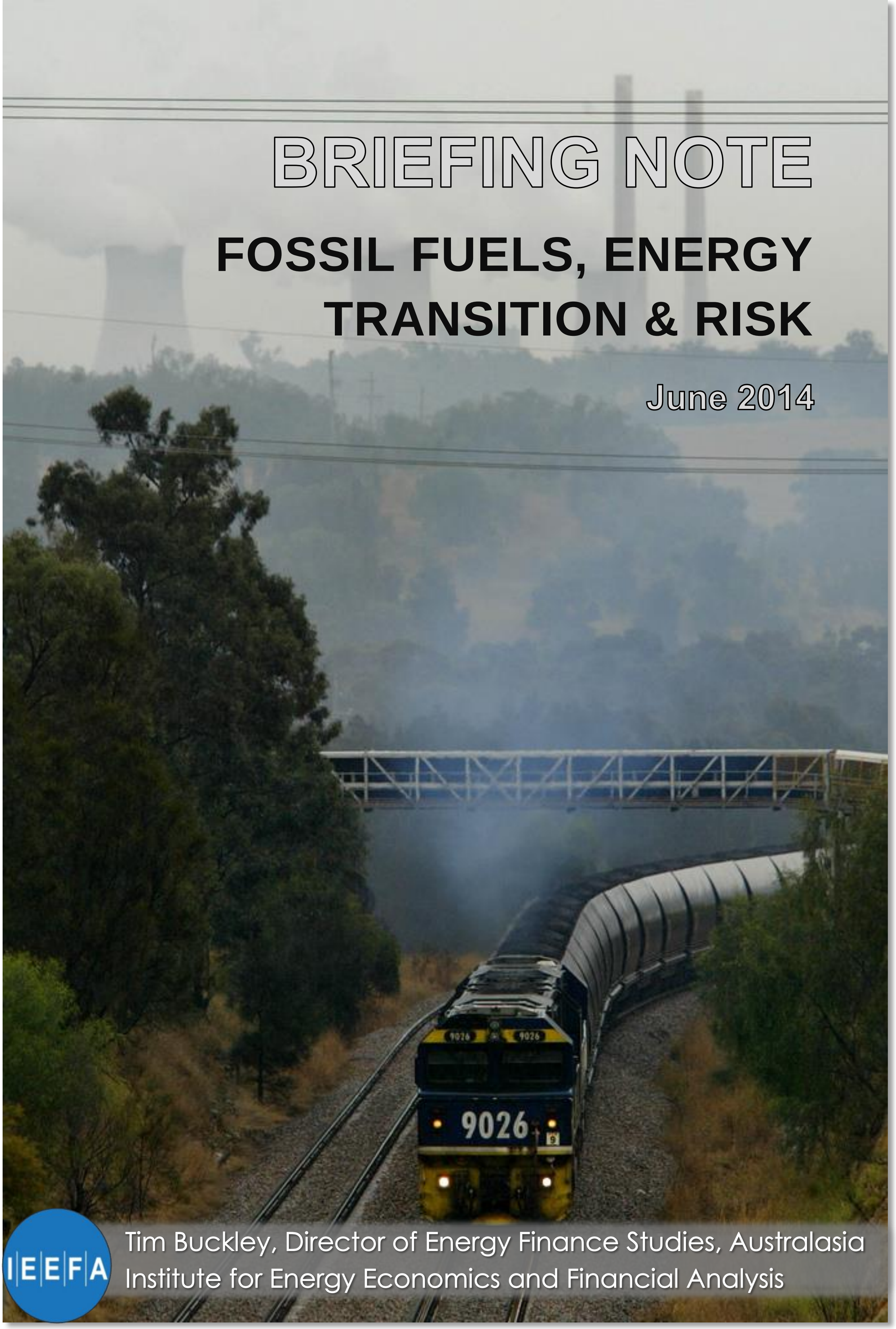


# BRIEFING NOTE

# FOSSIL FUELS, ENERGY TRANSITION & RISK

June 2014

Tim Buckley, Director of Energy Finance Studies, Australasia
Institute for Energy Economics and Financial Analysis

# IEEFA BRIEFING NOTE- Fossil Fuels, Energy Transition and Risk

## June 2014

*In this briefing note, the Institute for Energy Economics and Financial Analysis (IEEFA) explores regulatory, market, technology and reputational risks resulting from the transformation of global energy markets – with a focus on the implications for Australian fossil fuel investment.*

## Executive Summary – *The Structural Decline of Coal?*

- A key theme emerging in the global energy markets relates to the increasing debate on the topic of cyclical verses structural decline in the thermal coal industry.
- Evidence continues to mount that investment in renewables, distributed solar and energy efficiency combined with regulatory change is continuing to erode the traditional demand base for thermal coal.
- This is a well established trend in developed countries like Germany and the United States. Germany's coal demand was down 11% year on year in the March quarter of 2014. President Obama's use of the Environmental Protection Agency's ability to regulate air pollution combined with record solar installs and a resurgence in US wind installations to see the same end spells the progressive decline in U.S. coal demand. The Environmental Protection Agency forecasts coal demand will fall 30% by 2030 due to its emissions rules.
- Further, the evidence that China is pursuing an energy policy that is based on more of everything except coal continues to increase. The US$400bn Russia-China gas transaction is a case in point. The doubling of China's solar target to 70GW by 2017 is another. A trebling of China's installed nuclear capacity by the end of next year is a third example.
- India is the last major bastion of growth in imported coal demand, for now. India's new Prime Minister Narendra Modi aims to kick-start investment and remove domestic growth impediments. Coal India Ltd aims to grow domestic coal production 6% over the next three years if logistics impediments are removed. If Modi is successful, more imported coal is not needed. Additionally, we question why India would lock in imported fossil fuel inflation when domestic renewables provide a more commercial solution that is able to be rapidly deployed without undermining India's current account deficit.
- Global financial markets continue to facilitate an increasing flow of capital to renewable energy. The growth of the U.S. "YieldCo" listed renewable equities sector and the global Green Bonds initiative illustrate this trend. Divestiture trends also show the increased focus on the risks of stranded fossil fuel assets.

# Key Developments in Energy Markets

## Fossil Fuels - Coal

### China's Electricity Market – Coal Consumption to Peak in 2014?

In April, Morningstar released a report entitled: "Burned Out: China's Rebalancing Heralds the End of Coal's Growth Story".[i] The key conclusion is that *"coal-fired generation peaks by 2014, then declines through 2020. Neither an economic rebalancing nor a political shift alone is sufficient to halt China's runaway coal demand growth. But together, they herald its end."* This analysis is more aggressive than IEEFA's prediction that coal demand will peak in China in 2016. It assumes that the structural shift from heavy industry and construction towards consumption and services will accelerate at the same time as China's economic growth continues to moderate. Coupled with continued investment in energy efficiency, renewables, gas and nuclear, this sees China's coal consumption peak in 2014.

*Coal plant in China. By Bill Beverly (Creative Commons)*

With Morningstar highlighting an enormous 24GW of new nuclear plants due to come online during 2014-2015 (delayed in 2011 for two years post Fukushima), plus significant installs of hydro, gas, wind, and solar, the impact on coal demand is more immediate than most forecasters assume.

Consistent with this, China has doubled its target for solar installs to 70GW by 2017.[ii] In China's initial Five Year Plan to 2015, the cumulative solar install target was 15GW by 2015. In November 2012 this was increased to 21GW by 2015, and then in January 2013 further increased to 35GW by 2015.

A building fully-equipped with solar power facilities in Dezhou, China. By Zhou Jianxin/for China Daily

In a separate report, Goldman Sachs forecast that China's thermal coal imports are expected to fall from 150 million tonnes (Mt) in 2013 to 146Mt in 2014, dwindling to 75Mt by 2018.[iii]

### German Electricity Market – Energy Efficiency and Renewables cut Coal Demand

German electricity consumption fell 4.6% year on year to 164 TWh in the March 2014 quarter, showing the continued impact of energy efficiency and distributed rooftop solar. Total renewable energy production was up 19% year-on-year to 40 TWh or 24.5% of the total German market. Electricity from coal was down 11% yoy to 71 TWh (38% of Germany's total), while gas-fired generation was down 19% yoy to 19 TWh (11% of Germany's total).[iv]

### Citi Research Updates Coal Forecast to Reflect 'Age of Renewables' Analysis

Citi Research's Ivan Szpakowski in May 2014 released a new report entitled "*Global Thermal Coal: When Cyclical Supply Met Structural Demand*" which forecasts the structural decline in coal demand. This builds on the earlier Citi report by Shar Pourreza: "*The Age of Renewables is Beginning*" and the increasing probability of sustained energy price deflation going forward.

## Fossil Fuels - Oil

### Carbon Tracker's Potentially Stranded Oil Capex

Carbon Tracker and Energy Transition Advisors launched a new report evaluating the global oil sector and the financial risks to upstream oil capital expenditures, which run at US$700billion annually.[v] The report in particular highlights the significant technical and financial risks of deep and ultra-deep water, oil sands and Arctic oil developments with a significant positioning on the US$80-100/bbl or more production cost curve. Oil accounts for 36% of the current global CO2 emissions.

## Fossil Fuels - Gas

### US$400 billion Russia-China Gas Deal

Russia and China announced a landmark US$400 billion transaction for Gazprom of Russia to export 38 billion cubic metres of gas annually to China National Petroleum Corporation for 30 years starting 2018. Bloomberg New Energy Finance estimates this equates to US$10/MMBtu. The pipeline infrastructure investment alone is estimated at US$70 billion. The implications of this transaction are profound. Clearly energy security and energy diversity are key to China. The strategic rationale to diversify away from coal is consistent with China's existing ambitious policy programs across energy efficiency, renewable energy, hydro and nuclear, as well as the absolute political focus on efforts to reduce air pollution. India will have to increase its focus here soon.

## Renewable Energy

### Wind Power Continues to experience Technology Advances and Deflation

With upwards of 10GW of new wind farms forecast to be commissioned in the U.S. over 2014-2015, wind and solar's cost competitiveness with gas is increasing. The U.S. Henry Hub gas price has doubled from its 2012 record lows to a current US$4.66/MMBtu. With U.S. electricity demand in its fifth year of a flat to declining trend, and new renewable capacity continuing to be added, coal electricity production capacity continues to be marginalised. Gas electricity production is also at risk should gas prices move much above the average US$5/MMBtu seen in 2014 to-date.

At the Windpower 2014 Conference, Ryan Wiser, a staff scientist at the Lawrence Berkeley National Laboratory, highlighted innovations in blade and rotor design. Advances in materials have allowed the design of longer turbine blades and rotors that can operate efficiently at lower wind speeds. Since 2012, a "massive proliferation" of these turbines has driven average capacity factor increases up by 10% at every level of wind resource. As a result of these advances, costs are falling; preliminary data shows that the average 2013 power purchase agreement was at $0.021 per kilowatt-hour[vi] (US$21/MWh), net of the 30% ITC credit. This is a significant discount to the cost of gas-fired electricity generation, further underwriting continued deployment of wind.

### Record 1Q 2014 US Solar Installs, Deflation Continues

A record first quarter of solar installs was reported for the U.S. 1Q2014, with 1,571MW of solar installed, an increase of over 80% year on year. This included 517MW of solar thermal installations in the quarter. GTM reports that solar represented 74% of all new electricity generating capacity installed in the U.S. in 1Q2014 – Figure 1.[vii] The average price of solar continues to decline, with Figure 2 detailing the U.S. national average, showing the price differentials for residential, commercial and utility. However, the U.S. solar association calculates the 1Q2014 residential average is US$3.79/w or 20% lower than that reported if only current sales are included. We note this US$3.79/w is still double the Australian residential average. GTM Research forecasts installs in the U.S. overall for 2014 to a record 6.6GW, 39% yoy growth. The announced Utility pipeline for U.S. solar currently stands at 27.9GW.

**Figure 1: Total U.S. Generation Installs 1Q2014**

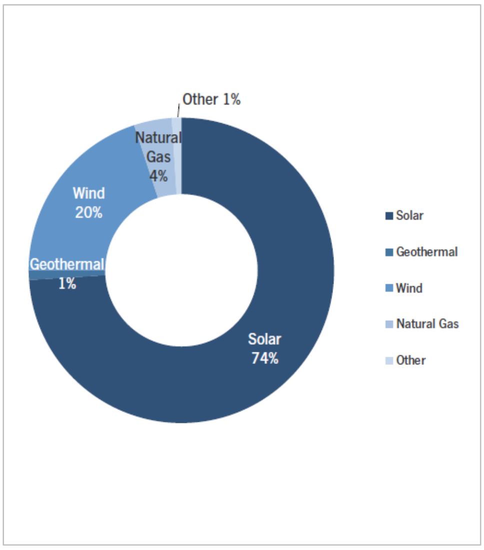
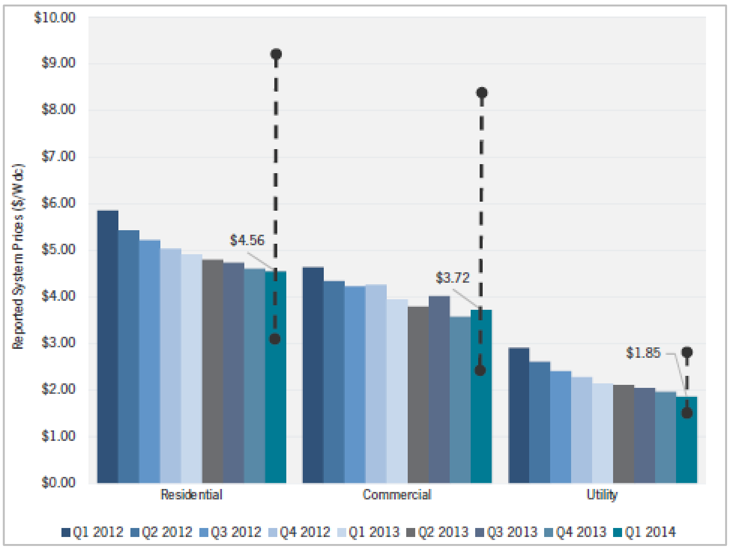


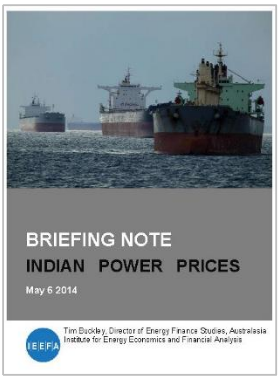

**Figure 2: Declining U.S. Solar Installed Costs**




*Source: GTM Research, May 2014*

# Major Project Updates

### India's Electricity System Can't Afford Imported Galilee Coal




Cover photo links to report

In May, IEEFA released a report entitled "*Indian Power Prices*"[viii] that questions the commercial viability of the proposed Galilee Coal Basin in Queensland in light of the implications for India's electricity market. Relative to current Indian wholesale electricity prices averaging Rs3-4/kWh, the cost of electricity generated from imported coal from Adani's Carmichael mine proposal would approach Rs6/kWh. The report also analyses the alternative cost of power generation using domestic wind, hydro and solar resources. Each of these alternatives are both immediately cost competitive verses imported coal and the cost differential will increase dramatically with time – given the deflationary nature of renewable energy vs the inflationary trends of fossil fuels.

We note in Coal India Ltd's 2013/14 analyst briefing[ix] the company targets 30-50Mt of additional domestic coal production annually for the next three years (6% pa). If Prime Minister Narendra Modi can remove domestic infrastructure bottlenecks in order to kick-start the dormant and financially overgeared Indian economy, India's need for massive new coal imports will dissipate regardless.

### Deutsche Bank and HSBC both Agree Not to Finance Abbot Point Coal Expansion

Deutsche Bank confirmed at its AGM in Germany that it will not fund any coal export port expansion. Co-chair Juergen Fitschen said:

Abbot Point, Qld

*"As there is clearly no consensus between the Australian government and UNESCO regarding the impacts of the Abbot Point expansion on the reef we will not consider financial applications of an expansion".*[x]

At HSBC Holdings AGM in London, the company was asked to match Deutsche Bank's commitment not to fund the Abbot Point port expansion adjacent to the Great Barrier Reef. In response, Chief Executive Officer Stuart Gulliver said it was "extraordinarily unlikely it would go near it."[xi]

# Global Policy Developments

### National Climate Assessment

The 2014 U.S. National Climate Assessment has been released. A key conclusion is that global climate is changing and this is apparent across the U.S. in a wide range of observations. The global warming of the past 50 years is primarily due to human activities, predominantly the burning of fossil fuels. Human-induced climate change is projected to continue, and it will accelerate significantly if global emissions of heat-trapping gases continue to increase. Planning for adaptation (to address and prepare for impacts) and mitigation (to reduce future climate change, for example by cutting emissions) is becoming more widespread, but current implementation efforts are insufficient to avoid increasingly negative social, environmental, and economic consequences.[xii]


### President Obama Directs the EPA on Carbon Pollution

President Obama has directed the U.S. Environmental Protection Agency (EPA) to introduce new regulations to set a national cap on carbon pollution from the U.S. fleet of 600 coal-fired power plants, the source of 40% of total U.S. emissions. This initiative is driven by the need for a low carbon transition and the need to address health issues relating to air pollution from coal.[xiii] It will see power plants cut emissions 30% by 2030 from levels of 25 years earlier. The EPA's plan provides for compliance flexibility in terms of enabling states to choose how they will meet their goals and recognises the efforts that states and companies have taken already toward balancing the needs for cleaner power, lower emissions and affordable energy." The EPA forecasts net benefits to America are US$28-49bn by 2020 when health cost savings are taken into account. The EPA also forecasts net coal demand will fall 30% from current levels by 2030.[xiv]

### Listed U.S. Renewable Energy YieldCos

A new listed vehicle is rapidly emerging in the U.S. that is bringing significant new capital to the renewable energy sector. The listed entity is called a "YieldCo", given the focus on paying a high 5-6% pa and growing dividend yield from the operating cashflows of the business.

On 30 May 2014 SunEdison Inc. declared that its "YieldCo" unit TerraForm Power Inc. will be brought to the equity market via an initial public offering.[xv] TerraForm Power will buy operating renewable assets from its parent entity (SunEdison Inc.), and commits to paying out most of the resulting operational cashflow to shareholders via dividends. Most listed U.S. companies target high capital growth, but have very low dividend payouts (of 20-30% vs 60-75% in Australia). The "YieldCo" concept is proving very popular for investors who are reticent to buy long dated U.S. government bonds, given almost record low yields of 2.48% on 10 year U.S. government bonds currently.[xvi]

On 20 May 2014 Nextera Energy Inc. announced plans to undertake an initial public offering of Nextera Energy Partners LP. Similar to TerraForm Power, this new vehicle will own and operate clean energy projects with stable, long term cashflows.[xvii]

**Green Bonds Market Development**

After a record first quarter 2014 issuance, the global Green Climate Bond market saw its largest ever bond issue in May 2014. A €2.5 billion green issue by GDF Suez was three times over-subscribed with half being 1.375% interest rate six year bonds, and the rest being 12 year 2.375% pa interest rate bonds. The proceeds' use will be independently reviewed and audited.[xviii] This follows the European Investment Bank issuing a €350 million 1.375% rate, five year bond. A third issue in May was undertaken by the World Bank for US$369m.[xix]

Global financial markets can leverage huge amounts of capital for products with the right structure. Green Bonds and YieldCos are two such examples.

**World Bank Launches First Kangaroo Green Bond**

The World Bank priced a A$300m 5-year fixed rate Kangaroo green bond, the first of its kind in the Australian domestic market. World Bank Green Bonds support its lending to eligible development programs that are designed to address the challenges of climate change. The World Bank has now issued a total of US$5.6 billion equivalent in green bonds since its inaugural green bond in 2008.

The bonds were placed with 15 investors, including Aberdeen Asset Management, AMP, Australian Ethical Investment, Colonial First State, Local Government Super, QBE Insurance and UniSuper. The investors involved all have a specific interest in supporting climate-smart projects within their investment mandates, alongside their traditional investment considerations such as safety of investment and risk-adjusted returns.

"*UniSuper, one of Australia's largest not-for-profit superannuation funds, has been working with the World Bank for several months as it has been refining its Socially Responsible investment options to include green bonds. UniSuper is pleased to cornerstone the World Bank's first green bond issue into the Australian market. This transaction demonstrates the World Bank's leading role in further developing the green bond and SRI debt capital markets overall.*" said Talieh Williams, UniSuper's Manager, Governance and Sustainable Investment.[xx]

**China Expects to Launch a National Carbon Market by 2018**

China expects to launch a national carbon market in 2018, based on regional schemes it is presently piloting, a senior official at the country's planning ministry told a World Bank conference. National Development and Reform Commission (NDRC) official Wang Shu said: "*Based on the outcomes and experiences of the seven pilot regions, we will establish directly the national ETS to implement cap-and-trade scheme at a national scale*".[xxi]

**Korea to impose US$2/t coal import tax**

South Korea has announced a US$2/t coal import tax, effective July 2014.[xxii]

## Australian Policy & Regulation

**NSW Government Suspends Metgasco's gas licence**

In May 2014 NSW Energy Minister Anthony Roberts said he had suspended Metgasco's exploration licence at Bentley, near Lismore, due to "a lack of community consultation", and referred the project to the Independent Commission Against Corruption "following receipt of information concerning shareholdings and interests in Metgasco Limited".[xxiii]

**NSW Government Supports the RET**

In a significant break from the ranks of Liberal Governments, NSW Premier Mike Baird came out in support of the Renewable Energy Target, stating that renewable energy benefits consumers, helps energy security by diversifying sources and cuts greenhouse gas emissions.[xxiv] NSW has 8,395 megawatts of capacity worth about $13 billion, which are "progressing through the planning system".

**Federal and Queensland Governments Move to a 'One Stop Shop'**

The Federal Environment Minister Greg Hunt and Queensland Minister for Environment Andrew Powell have released a draft Queensland bilateral agreement on environmental approvals. Streamlining government environmental approvals is defined by the Federal Government as introducing a "One Stop Shop", which defers all environmental authority to the Queensland Government.[xxv] Given significant State vested interests, this undermines the existing regulatory approval process and reduces independent oversight at a time when the NSW Independent Commission Against Corruption is clearly revealing systematic breaches and a flawed process.

The main Commonwealth law, the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), deals with only around 400 referrals each year and mainly regulates actions affecting World Heritage properties, listed threatened species, and other "matters of national environmental significance". The projects that it regulates closely tend to be major ones.[xxvi]

# Reputational Risk

## Investor Responses - Australia

**AMP Capital introduces fossil fuel screening**

AMP Capital announced it will screen out companies with a material exposure to fossil fuels in its Responsible Investment Leaders (RIL) range of funds, in response to client demand. This fund will now screen out companies that have more than a 20% exposure to mining thermal coal, exploration and development of oil sands, brown-coal, coal-fired power generation, transportation of oil from oil sands or conversion of coal to liquid fuels/feedstock. AMP Capital Head of ESG Research Ian Woods said: "*The Charter of Operation requires the RIL funds to avoid investing in companies with a material exposure to activities that have a high negative social impact including the production and manufacture of tobacco, nuclear power (including uranium), armaments, alcohol, pornography and gambling*."[xxvii]

**Hunter Hall Ends Fossil Fuel Investments**

Hunter Hall Investment Management announced it will exclude investments in fossil fuel companies. Hunter Hall's Ethical Investment Policy excludes investment in companies directly involved in tobacco, gambling, armaments, uranium, nuclear energy, cutting down old growth forests and intensive animal husbandry. CIO Peter Hall said: "*The decision to exclude investments in fossil fuel companies is a natural addition to our existing list of exclusions*."[xxviii]

**Retail Australian Investors Express Concerns over Fossil Fuel Investments**

Concerns about coal and gas projects on the Great Barrier Reef and other protected areas are putting banks and super-funds at risk of losing customers, with 67% indicating they would choose a bank or superfund that doesn't invest in fossil fuels over one that does, a new survey from Lonergan Research has found. The nationwide survey of 1300 randomly-selected Australians shows that 77% are concerned about their bank or super fund financing coal and gas projects in or near the Great Barrier Reef and 72% are concerned about their bank or super fund financing coal and gas anywhere in Australia. Australians are also concerned about the long-term risks involved in investing in fossil fuels with 76% believing the risks associated with these investments are growing and 75% believing that Australia has too many eggs in the mining basket.[xxix]

## Investor Responses - Global

### Stanford University to Divest From Coal

Stanford University's endowment fund of US$18.7 billion has committed to divest its coal holdings. Stanford's president John Hennessy said: "*Moving away from coal in the investment context is a small but constructive step while work continues at Stanford and elsewhere to develop broadly viable sustainable energy solutions for the future*".[xxx]

Stanford University. By Al Seib

Coal Plant. By Emilian Robert Vicol

### Blackrock and FTSE Launch New Fossil Free Index

BlackRock, the world's largest fund manager, has teamed up with London's FTSE Group to help investors avoid coal, oil and gas companies without putting their money at risk. The FTSE market benchmarks are the first from a leading index group that specifically bar fossil fuel companies. There is growing interest from investors keen to understand the risks of fossil fuel holdings. FT reports Kevin Bourne, a FTSE managing director said: "*This is one of the fastest-moving debates I think I've seen in my 30 years in markets*".[xxxi] BlackRock is launching a new fund to track the new FTSE benchmark.

### Fossil-free investment portfolios soared 50% in 2013

The number of investment managers offering fossil-free portfolios to clients increased by over 50% in the past year, demonstrating a growing interest in fossil fuel divestment among investors. In a survey completed by 587 investment professionals, 36% indicated that they now offered investors the option to explicitly exclude the fossil fuel industry from their investments – up from 22% in 2013. The findings show a growing trend of investors turning away from oil, coal and gas on both ethical and financial grounds. Such investments create a financial as well as a climate risk, as strengthening climate policies mean that unburned reserves of fuel could become stranded assets.[xxxii]

# Important Information

This report is for information and educational purposes only. It is intended solely as a discussion piece focused on the topic of the Australian energy sector, with respect to investment, policy and regulatory trends and the risks of stranded assets. Under no circumstance is it to be considered as a financial promotion. It is not an offer to sell or a solicitation to buy any investment referred to in this document; nor is it an offer to provide any form of investment service.

This report is not meant as a general guide to investing, or as a source of any specific investment recommendation. While the information contained in this report is from sources believed reliable, we do not represent that it is accurate or complete and it should not be relied upon as such. Unless attributed to others, any opinions expressed are our current opinions only.

Certain information presented may have been provided by third parties. The Institute for Energy Economics and Financial Analysis believes that such third-party information is reliable, but does not guarantee its accuracy, timeliness or completeness; and it is subject to change without notice. If there are considered to be material errors, please advise the authors and a revised version can be published.

# References

i Daniel Rohr, Strategist Basic Materials, Morningstar, "*Burned Out: China's Rebalancing Heralds the End of Coal's Growth Story*"; April 2014.
ii http://www.ieefa.org/press-release-chinas-ambitious-new-solar-targets-put-australian-export-coal-at-further-risk/
iii http://www.platts.com/latest-news/coal/singapore/global-thermal-coal-imports-growth-to-slow-to-21668488
iv http://reneweconomy.com.au/2014/coal-renewables-47239
v http://carbontracker.org/wp-content/uploads/2014/05/CAR_Brochure_WEB_SHORT.pdf
vi http://www.greentechmedia.com/articles/read/The-Price-Gap-Is-Closing-Between-Renewables-and-Natural-Gas
vii http://www.seia.org/sites/default/files/resources/fxD2AN7d502014q1smies.pdf
viii http://www.ieefa.org/briefing-note-india-power-prices/
ix https://www.coalindia.in/en-us/newsmedia/pressreleases.aspx
x http://www.brisbanetimes.com.au/queensland/bank-wont-fund-port-expansion-due-to-reef-fears-20140523-zrm0h.html#ixzz33RzrQzvh
xi http://www.ieefa.org/press-release-hsbc-follows-deutsche-banks-lead-to-rule-out-great-barrier-reef-coal-port-investment-financing/
xii http://nca2014.globalchange.gov/downloads
xiii http://www.whitehouse.gov/blog/2014/05/31/weekly-address-reducing-carbon-pollution-our-power-plants
xiv **http://www.vox.com/2014/6/1/5770556/EPA-power-plant-rules-explainer**
xv http://www.nasdaq.com/article/sunedison-to-initiate-ipo-analyst-blog-cm357874
xvi http://online.wsj.com/articles/treasurys-rise-yield-touches-2014-low-1401284037
xvii http://www.investor.nexteraenergy.com/phoenix.zhtml?c=88486&p=irol-newsArticle&ID=1932779&highlight=
xviii http://www.climatebonds.net/2014/05/gdf-suez-does-whopper/
xix http://www.climatebonds.net/2014/05/aaa-away-eib-does-eur350m-480m-tap-its-big-5yr-climate-awareness-bond-world-bank-does
xx http://treasury.worldbank.org/cmd/htm/AUD300Million_First_Kangaroo_Green_Bond.html
xxi http://www.rtcc.org/2014/05/30/china-expects-to-launch-national-carbon-market-in-2018/#sthash.TVjExIE3.dpuf
xxii **http://www.reuters.com/article/2014/06/03/coal-southkorea-idUKL3N0OK0XH20140603?irpc=932**
xxiii http://www.smh.com.au/nsw/obeid-family-link-to-gas-drilling-firm-20140515-38cw4.html#ixzz31p1IK2Wt
xxiv http://www.smh.com.au/environment/climate-change/mike-baird-gives-backing-for-renewable-energy-target-20140528-394ri.html
xxv http://statements.qld.gov.au/Statement/2014/5/14/final-stage-reached-on-federal-environmental-approvals-in-queensland
xxvi http://theconversation.com/explainer-one-stop-shop-for-environmental-approvals-19515
xxvii http://www.financialstandard.com.au/news/view/40538560
xxviii http://www.hunterhall.com.au/pdf/Announcements_HHIML/FFF_Announcement_Web.pdf
xxix http://bit.ly/1kxAiOL
xxx http://www.washingtonpost.com/blogs/wonkblog/wp/2014/05/06/stanford-becomes-the-most-prominent-university-yet-to-divest-from-coal/
xxxi http://www.ft.com/cms/s/0/14787a44-cef6-11e3-ac8d-00144feabdc0.html#axzz33Ri7RelS
xxxii http://www.rtcc.org/2014/05/15/fossil-free-investment-portfolios-soared-50-in-2013/#sthash.aGVovyB3.dpuf