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ENSURING A FUTURE FOR AUSTRALIAN COAL FIRED POWER STATIONS

Submission to the Senate Environment and
Communications Committee

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About the author

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Terms of Reference: Senate Environment and Communications Committee Inquiry into the Retirement of Coal Fired Power Stations¹

On 13 October 2016, the Senate referred the following matter to the Environment and Communications References Committee for inquiry and interim report by **28 November 2016** and final report by **1 February 2017**:

- a. the experience of closures of electricity generators and other large industrial assets on workers and communities, both in Australia and overseas;
- b. the role that alternative mechanisms can play in alleviating and minimising the economic, social and community costs of large electricity generation and other industrial asset closures, drawing on experiences in Australia and overseas;
- c. policy mechanisms to encourage the retirement of coal-fired power stations from the National Electricity Market, having regard to:
 - i. the 'Paris Agreement' to keep global warming below 2 degrees celsius, and ideally below 1.5 degrees celsius,
 - ii. the state and expected life span of Australia's coal-fired power plants,
 - iii. the increasing amount of electricity generated by renewable energy and likely future electricity demand,
 - iv. maintenance of electricity supply, affordability and security, and
 - v. any other relevant matters;
- d. policy mechanisms to give effect to a just transition for affected workers and communities likely impacted by generator closures, as agreed in the 'Paris Agreement', including:
 - i. mechanisms to ensure minimal community and individual impact from closures, and
 - ii. mechanisms to attract new investment and jobs in affected regions and communities;
- e. the appropriate role for the Federal Government in respect of the above; and
- f. any other relevant matters.

¹ Parliament of Australia, Senate Standing Committee on Environment and Communications Inquiries page, http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Environment_and_Communications/Coal_fired_power_stations

1 Introduction and Context on the World-Wide Use of Coal

The energy debate in Australia and role of coal-fired power stations is taking place in an international environment where coal consumption, including for the generation of electricity, has increased considerably and will continue to do so.

Between 1965 and 2015, total annual world consumption of coal (i.e. not just for the production of electricity) increased by 174% from 1,401 million tonnes of oil equivalent (Mtoe) per annum in 1965 to 3,839 Mtoe in 2015.²

Coal is responsible for 29.2% of global primary energy consumption, just behind oil (32.9%) and gas (23.8%) and way ahead of hydroelectricity (6.8%), nuclear power (4.4%) and renewables (2.8%). Together, fossil fuels account for nearly 86% of global energy and with nuclear power over 90%.³

In terms of electricity, world consumption doubled from 10,092 terawatt hours (TWh) in 1990⁴ to 20,144TWh in 2013.⁵ During this period coal, oil and gas were responsible for 71% of the increase in generated power, with coal-fired power generation more than doubling.⁶

Safe, reliable and affordable industrial scale energy fuels the increased production and safe storage of food, clean drinking water, access to and safe storage of medicine, the ability to heat and cool our homes and businesses, and improved clothing, housing and transport options.

Improved energy access has played an important role in the decrease in the percentage of the world population living in poverty from up to 94.4% in 1820 to less than 10% in 2015. The number of people living in extreme poverty declined by nearly 80 percentage points between 1981 and 2015 alone.⁷

Yet the International Energy Agency's 2015 World Energy Outlook noted that around 1.2 billion people, or 17% of the global population still do not have access to electricity, 240 million of whom are in India.⁸

Around 2.7 billion people also rely on biomass for cooking, including 840 million people in India, one third of the Chinese population, and over 750 million residents of sub-Saharan Africa.⁹

On top of this, in 2014 the United Nations predicted that the world's urban population would increase from 3.9 billion people in 2014 to 6.4 billion people by 2050.¹⁰

2 BP Statistical Review of World Energy June 2016 and Data Workbook, <http://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html>

3 Ibid.

4 International Energy Agency, *World Energy Outlook 2014*, p.206, <http://www.worldenergyoutlook.org/weo2014/>

5 International Energy Agency, *World Energy Outlook 2015*, p.307, <http://www.worldenergyoutlook.org/weo2015/>

6 International Energy Agency, *World Energy Outlook 2014*, p.208 and *World Energy Outlook 2015*, p.310

7 <https://ourworldindata.org/grapher/declining-global-poverty-share-1820-2015>

8 International Energy Agency, *World Energy Outlook 2015*, pp 101, <http://www.worldenergyoutlook.org/weo2015/>

9 Ibid. p.105

10 United Nations Population Division, *Population Prospects 2014*, <https://esa.un.org/unpd/wup/>

India is expected to have an extra 404 million city dwellers in 2050, China 292 million and the African continent over 800 million.

For India alone, 404 million people in 36 years is equivalent to 11.2 million people per year, or 30,745 people per day or 1,281 people every hour moving to its cities.

Regardless of what the so-called 'developed world' does to change its electricity generation mix and reduce carbon dioxide emissions, it is the needs of developing nations that will drive international energy consumption in coming decades.

2 Future Electricity Forecasts and the Role of Coal

While estimating future electricity demand and sources is an imprecise art, and while government policies are likely to continue to force renewables onto the market for the foreseeable future, some trends are difficult to ignore.

Probably the most widely cited annual forecast is the International Energy Agency's (IEA) World Energy Outlook, which is published each November.

In each publication it makes predictions based on three scenarios – "Current Policies," "New Policies," and a third, carbon constrained category currently known as the "450 Scenario." The designated "New Policies" scenarios is the IEA's preferred as it seeks to take account of firm future plans rather than just assuming that existing policies will continue.

Under its preferred 'New Policies' scenario in the 8 November 2015 edition,^{11 12} the IEA noted that electricity demand was expected to increase by another 71% to 34,457 TWh by 2040. Even under the carbon-constrained "450 Scenario" demand will still increase by 48% to 29,924 TWh by 2040.

- Between 2013 and 2040, electricity consumption in:
- China will double from 4,751TWh to 9,467 TWh;
- India will more than triple from 897 TWh to 3,288TWh;
- Africa will almost triple from 621TWh to 1,791TWh; and
- South East Asia will more than double from 716TWh to 1,979TWh.

It is unfeasible that this massive expected increase in industrial scale electricity in just 27 years will come about because of solar and wind farms.

While the percentage share of coal in the world electricity generation market will likely reduce

¹¹ International Energy Agency, *World Energy Outlook 2015*, <http://www.worldenergyoutlook.org/weo2015/>

¹² Note that the 2016 edition is scheduled to be published on 16 November

over the next 25 years due to the increased deployment of taxpayer-subsidised renewables or even gas, the total amount of electricity generated by coal will still be higher in 2040 than today.

The IEA notes that electricity generated by coal will increase by 23% from 9,612 TWh in 2013 to 11,868TWh in 2040 and that coal generating capacity will increase from 1,851 gigawatts (GW) in 2013 to 2,468GW in 2040.

On coal-fired plant capacity, the IEA has also observed that:

- Asia will add 883GW of new coal capacity between 2015 and 2040, including 383GW in China and 306GW in India, while retiring only 127GW;¹³
- an average of 200 megawatts of new coal capacity was commissioned every day between 2010 and 2014;¹⁴ and
- coal-fired power station plant life is around 50 years.¹⁵

In other words, even acknowledging the differences of opinion on forward coal consumption forecasts, a significant proportion of coal-fired power plants are new, and are unlikely to be taken off the market any time soon.

Environmental Organisation Forecasts and Observations

Even organisations that are ideologically opposed to coal, acknowledge this trend.

In March 2016, Coal Swarm, the Sierra Club and Greenpeace published *Boom and Bust 2016: Tracking the Global Coal Plant Pipeline*,¹⁶ which claimed that 338GW of new coal plant capacity was under construction with an additional 1,086GW planned – “the equivalent of 1,500 coal plants.”

Boom and Bust also found that 84GW of new coal capacity was added in 2015 alone and that since 2010 a total of 473GW had been built globally, 90% of which was in Asia.

Even Greenpeace last month in an online article¹⁷ ostensibly about the cancellation by China of 30 coal-fired power stations under construction, said that there are still 1,020 coal plants in China and India that are either under construction or planned.

To put this in perspective, the total installed capacity in Australia’s National Energy Market (including coal, gas and renewables) was 47.6GW in 2015.¹⁸

The 2015 *Coal Finance Report Card*, published by the Rainforest Action Network, BankTrack and the Sierra Club¹⁹ found that global financing for coal mines and the top 30 coal-fired power station companies was worth \$141 billion in 2015, down only marginally from \$145 billion in 2013.

13 International Energy Agency, *World Energy Outlook 2015*, p.312, <http://www.worldenergyoutlook.org/weo2015/>

14 International Energy Agency, Coal Information Page, <http://www.iea.org/topics/coal/>

15 International Energy Agency, *World Energy Outlook 2015*, p.311, <http://www.worldenergyoutlook.org/weo2015/>

16 Sierra Club, *Boom and Bust 2016*, [http://sierraclub.org/sites/www.sierraclub.org/files/uploads-wysiwig/final%20boom%20and%20bust%202017%20\(3-27-16\).pdf](http://sierraclub.org/sites/www.sierraclub.org/files/uploads-wysiwig/final%20boom%20and%20bust%202017%20(3-27-16).pdf)

17 Greenpeace Energy Desk, “China Starts Cancelling Under-Construction Coal Plants,” 21 October 2016, <http://energydesk.greenpeace.org/2016/10/21/china-coal-crackdown-cancel-new-power-plants/>

18 Australian Energy Regulator, *State of the Energy Market 2015*, p.24, <https://www.aer.gov.au/publications/state-of-the-energy-market-reports/state-of-the-energy-market-2015>

19 Rainforest Action Network, BankTrack, Sierra Club, *The End of Coal: Coal Finance Report Card 2015*, http://www.banktrack.org/show/pages/2015_coal_finance_report_card_report

Even Bloomberg New Energy Finance's *New Energy Outlook 2016*²⁰ found that while the global push for renewables is expected to cost an astonishing \$7.8 trillion between 2016 and 2040, investment in coal and gas fired power would still equal \$1.2 trillion and \$892 billion over the same period respectively.

While it is understandable that different stakeholders in this debate may cite different sources, make different claims or at times come to different conclusions, it is difficult to argue against the facts that the worldwide construction of coal-fired power stations has not slowed down, and coal will continue to be required, to fuel them.

Coal represents the fastest, cheapest and the most reliable way for developing countries to industrialise and for all countries to maintain a stable electricity supply.

Irrespective of the source, or the scope, world demand for, and use of, coal as an important electricity source is not going to change in the foreseeable future.

Demand has driven, and will continue to drive, electricity consumption and supply decisions.

3 Market for Coal

Anti-coal campaigners typically over-exaggerate the decline of coal as an important source of world electricity, and completely ignore its essential role in the production of steel.

According to the Minerals Council of Australia, 800 kilograms of coal is needed to make just one tonne of steel²¹ and the Queensland Resources Council also notes that a 1MW wind turbine requires 220 tonnes of coal in its construction.²²

In 2015, the Minerals Council reported that the Australian coal industry fuels over 70 per cent of Australia's electricity, directly employs over 41,000 people, pays \$6 billion in wages each year and is responsible for the indirect employment of an additional 110,000 people.²³

Coal is also Australia's second largest export earner, worth \$37 billion in 2015.²⁴

While prices and volumes in the international market for both metallurgical (steel making) and thermal (electricity) coal ebb and flow, as they do for every commodity or service, commentary from environmental activists can be a little selective.

20 Bloomberg New Energy Finance, *Energy Outlook 2016*, 12 June 2016, https://about.bnef.com/press-releases/coal-and-gas-to-stay-cheap-but-renewables-still-win-race-on-costs/?utm_source=neoweb&utm_medium=link&utm_content=pressrelease&utm_campaign=NEO2016

21 Minerals Council of Australia, *Coal Hard Facts*, 2nd Edition, p.18, http://www.minerals.org.au/file_upload/files/publications/Coal_Hard_Facts_2nd_Edition_FINAL.pdf

22 Queensland Resources Council Opinion Piece, 7 September 2016, <https://www.qrc.org.au/media-centre/feature-articles-2/>

23 Ibid, pp 3 and 14

24 Australian Government, Department of Foreign Affairs and Trade, *Australia's Trade in Goods and Services 2015*, <http://dfat.gov.au/about-us/publications/trade-investment/australias-trade-in-goods-and-services/Pages/australias-trade-in-goods-and-services-2015.aspx>

An example that is typical of this approach can be observed a January 2015 briefing note from the Institute for Energy Economics and Financial Analysis, an organisation whose Mission according to its website is to *“accelerate the transition to a diverse, sustainable and profitable energy economy and to reduce dependence on coal and other non-renewable energy resources.”*²⁵

A section entitled *“Pricing Trends in Thermal Coal,”* highlighted that *“thermal export coal prices fell another 25 percent over 2014”* and included this graph, which had a start date of December 2009:²⁶

Figure 1 Benchmark Australian Thermal Coal Hits Four Year Low in Dec 2014



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

The section even went on to highlight directly after this graph that media reports had suggested the *“price has fallen another 10% to US\$57/t in January 2015.”*

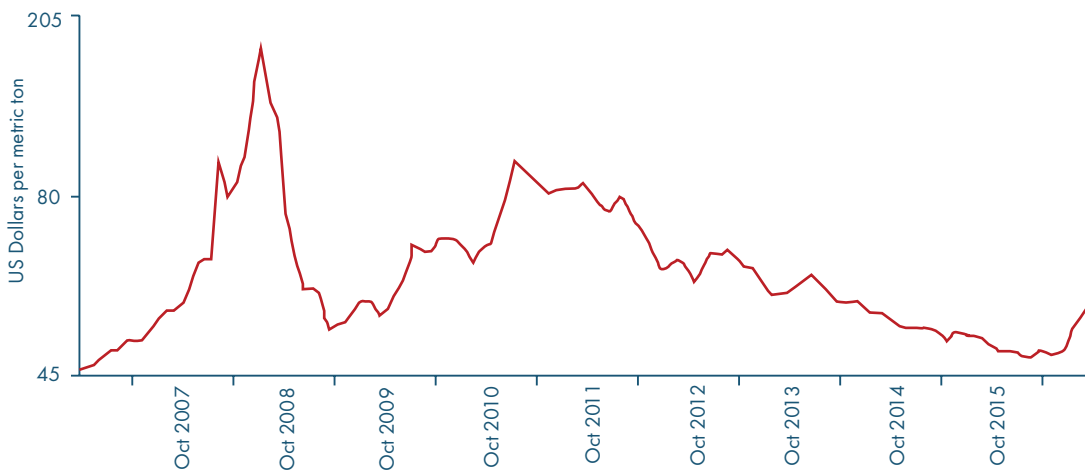
The message conveyed by the note, and the graph in particular, is the decline in international demand for coal, focusing on its value.

While at face value this trend in this and similar graphs, which often begin in 2010 or 2011, is clear and concerning, using the same website but extending the captured period backwards by another five years reveals a different picture entirely.

²⁵Institute for Energy Economics and Financial Analysis website, About page, <http://ieefa.org/about/>

²⁶Institute for Energy Economics and Financial Analysis, *Global Energy Markets in Transition* Briefing Note, January 2015, http://ieefa.org/wp-content/uploads/2015/01/IEEFA-BRIEFING-NOTE-Global-Energy-Markets-in-Transition_Final_15Jan2015.pdf

Figure 2 Australian Thermal Coal Monthly Price, US Dollars per Metric Ton²⁷



In fact, while it is true that the international thermal coal price has declined from its July 2008 high of US\$192.86 per ton or even from its January 2011 peak of US\$141.94, even at its lowest point in January 2016 it was only back to its December 2006 level.

Going back fifteen or twenty years returns a similar result.

It is just not accurate for environmental campaigners to imply that the international thermal coal price signifies some sort of terminal decline. Sometimes prices moves up, and sometimes they move down. Thermal coal prices have just returned to a long term average.

Given that as indicated earlier, there is little prospect of a decline in international demand for thermal coal, and the Australian Government Industry Department’s Office of the Chief Economist recently reported,²⁸ steel production and consumption in coming years is expected to remain at around 1,600 million tonnes per annum, the market appears to have some life in it yet.

²⁷IndexMundi website, Australian thermal coal monthly price, October 2006 to September 2016, <http://www.indexmundi.com/Commodities/?commodity=coal-australian&months=120>

²⁸Australian Government, Office of the Chief Economist, *Resources and Energy Quarterly*, September 2016, <http://www.industry.gov.au/Office-of-the-Chief-Economist/Publications/Documents/req/REQ-September-2016.pdf>

4 India

As noted earlier, there are approximately 840 million people in India who rely on biomass for cooking and 240 million people who do not yet have access to electricity.

India's submission to the Paris 2015 climate change talks²⁹ also said that that country has the world's largest proportion of global poor, 92 million people without access to safe drinking water and 1.77 million people who are homeless.

The Government of India is acutely aware that if it is to emulate China and bring hundreds of millions of people out of poverty as soon as possible, then it must increase energy consumption, which at 917 kilowatt hours (kWh) per capita per year, is around one third of the world's average and considerably less than Australia (10,134kWh in 2013).³⁰

Of course, this 917kWh figure doesn't take account of wide disparities between different Indian regions, with average residential electricity consumption in the State of Bihar at only 50kWh per capita per year³¹ which is equal to using a single 60 watt lightbulb for 2.5 hours a day all year.³²

The village of Dharnai in Bihar was of course the subject of an article last year in Scientific American about how a Greenpeace-led effort to install village solar power in place of access to the main grid backfired, when residents, fed up with intermittent supply and usage restrictions, demanded "*real electricity not fake electricity*."³³

To this end, while India's Intended Nationally Determined Contribution (INDC), canvasses increasing its solar, wind, hydroelectric and nuclear power generation, it is also open about significantly increasing its coal-fired power station capacity, noting that "coal will continue to dominate in the future."³⁴

Again, going straight to the source, and examining the historic capacity figures of India's Central Electricity Authority, in the twelve months between 1 October 2015 when it submitted its INDC and 1 October 2016, its coal-fired power station capacity had increased from 169.1GW³⁵ to 187.2GW, more than four times the amount of new wind or new solar.³⁶

In other words, India has increased its coal-fired generation capacity in just the last twelve months (18.1GW) by an amount equivalent to three times Victoria's current total coal-fired capacity.³⁷

²⁹India's *Intended Nationally Determined Contribution*, <http://www4.unfccc.int/submissions/INDC/Published%20Documents/India/1/INDIA%20INDC%20TO%20UNFCCC.pdf>

³⁰World Bank, Electric Power Consumption, <http://data.worldbank.org/indicator/EG.USE.ELEC.KH.PC>

³¹International Energy Agency, *World Energy Outlook 2015*, p.429, <http://www.worldenergyoutlook.org/weo2015/>

³²(60 watts x 2.5 hours x 365 days / 1,000 = 54.75kWh)

³³Scientific American, "Coal Trumps Solar in India," 19 October 2015, <https://www.scientificamerican.com/article/coal-trumps-solar-in-india/>

³⁴India's *Intended Nationally Determined Contribution*, p.10, <http://www4.unfccc.int/submissions/INDC/Published%20Documents/India/1/INDIA%20INDC%20TO%20UNFCCC.pdf>

³⁵Government of India, Central Electricity Authority, All India Installed Power Station Capacity, 30 September 2015, http://www.cea.nic.in/reports/monthly/installedcapacity/2015/installed_capacity-09.pdf

³⁶Government of India, Central Electricity Authority, All India Installed Power Station Capacity, 30 September 2016, http://www.cea.nic.in/reports/monthly/installedcapacity/2016/installed_capacity-09.pdf

³⁷(Loy Yang A 2,200MW, Hazelwood 1,542MW, Yallourn 1,480MW & Loy Yang B 953MW)

The rest of the developing world shares India's need to increase the generation of electricity for both residential and industrial consumption, which will ensure that the burning of fossil fuels such as coal will continue for the foreseeable future.

The closure of Australian coal-fired power stations and loss of thousands of jobs will have no impact on world carbon dioxide emissions.

5 Germany

While South Australia could be cited as a glimpse of Australia's energy future, the Committee may also consider the reality on the ground in Germany, which has been pursuing its own 'Energiewende' (Energy Transformation) for quite some time.

Even though Germany's former Greens Environment Minister once reportedly said that the cost of its transition to renewables would be no more than "*a scoop of ice cream*,"³⁸ a claim similar to the Victorian Energy Minister's June declaration that a 40% renewables target would only cost "*cents per week*,"³⁹ the reality on the ground is quite different.

Despite over 30% of German energy now being sourced from renewables,⁴⁰ which in most markets would be considered critical mass, Germany now has the second highest residential electricity prices in Europe⁴¹ (just behind wind-rich Denmark), with household bills comprised of over 45% taxes and charges.⁴²

But just last month, Germany's transmission network operators announced another increase in the Renewable Energy Levy, which since 2000 has climbed from 0.2 cents per kilowatt hour⁴³ to 6.88 cents.⁴⁴ This levy alone is now equal to over 280 Euros per year for the average household and is still only around one fifth of a consumer's power bill.⁴⁵

Interestingly, this Renewable Energy Levy is used to help fund new renewable projects and to

38 Der Spiegel Online, "How Electricity Became a Luxury Good," 4 September 2013, <http://www.spiegel.de/international/germany/high-costs-and-errors-of-german-transition-to-renewable-energy-a-920288.html>

39 Renew Economy, Interview with Victorian Energy Minister Lily D'Ambrosio, 15 June 2016, <http://reneweconomy.com.au/interview-lily-dambrosio-on-victorias-40-renewable-energy-target-49394/>

40 United States Energy Information Administration, "Germany's Renewables Electricity Generation Grows in 2015 but Coal Still Dominant," 24 May 2016, <http://www.eia.gov/todayinenergy/detail.php?id=26372>

41 Eurostat, Electricity and Gas Prices, 2015, [http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Electricity_and_gas_prices,_second_half_of_year,_2013%E2%80%9315_\(EUR_per_kWh\)_YB16.png](http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Electricity_and_gas_prices,_second_half_of_year,_2013%E2%80%9315_(EUR_per_kWh)_YB16.png)

42 Clean Energy Wire, "What German Households Pay for Power," 2 November 2016, <https://www.cleanenergywire.org/factsheets/what-german-households-pay-power>

43 Der Spiegel Online, "Verbrauchern Drohen Höhere Stromkosten," 13 October 2015, <http://www.spiegel.de/wirtschaft/unternehmen/energie-eeg-umlage-steigt-auf-6-35-cent-a-1057640.html>

44 Clean Energy Wire, "EEG Surcharge 2017," 14 October 2016, <https://www.cleanenergywire.org/news/germany-set-miss-climate-goals-think-tank/eeg-surcharge-2017>

45 Reuters, "Germans to Pay Higher Surcharge for Renewable Electricity in 2017," 14 October 2016, <http://www.reuters.com/article/germany-renewables-idUSL8N1CK1CR>

compensate existing renewable generators for the fall in the wholesale price. So in other words, the surcharge needs to be increased to compensate for the low wholesale electricity prices created by all of the renewables built with the surcharge.

In October, the Dusseldorf Institute for Competition Economics released a report which found that the Energiewende had already cost Germany 150 billion Euros to implement since 2000 and that the total cost by 2025 would be 520 billion Euros, including 408 billion Euros just for the Renewable Energy Levy.^{46 47}

With the recent South Australian blackout in mind, it may be worth noting that Germany was reportedly forced to spend 1 billion Euros on energy grid stabilization in 2015 alone.⁴⁸

If Germany, which has a much bigger economy than Australia, a broader mix of generating options including nuclear, and the ability to import electricity from other nations, is struggling to cope with a mandated push towards renewables, then how realistic is it, that Australia will do any better?

Interestingly, it appears that German efforts to reduce carbon dioxide appear to have stalled since 2009,⁴⁹ and European Union emissions increased in 2015,⁵⁰ suggesting that while it is easy for governments to set targets, economies don't always follow through.

46Institute for New Social Market Economy website, 10 October 2016, <http://www.insm.de/insm/Presse/Pressemeldungen/Pressemeldung-Studie-EEG.html>

47English translation, Global Warming Policy Foundation, 11 October 2016, <http://www.thegwpf.com/germanys-renewable-energy-cost-explosion-25000-euros-for-each-family-of-four/>

48The Guardian, 12 October 2016, "Germany Takes Steps to Roll Back Renewable Energy Revolution," <https://www.theguardian.com/environment/2016/oct/11/germany-takes-steps-to-roll-back-renewable-energy-revolution>

49Clean Energy Wire, Germany's Greenhouse Gas Emissions and Climate Targets, Figure 2, 17 March 2016, <https://www.cleanenergywire.org/factsheets/germanys-greenhouse-gas-emissions-and-climate-targets>

50Eurostat Media Release, "In 2015, CO2 emissions in the EU Estimated to have Slightly Increased Compared to 2014," 24 May 2016, <http://ec.europa.eu/eurostat/documents/2995521/7244707/8-03052016-BP-EN.pdf/88e97313-dab3-4024-a035-93b2ab471cd9>

6 Port Augusta Closures

On 7 October 2015, Alinta Energy announced the final closure in March 2016 of its two Port Augusta coal-fired power stations (i.e. Northern and Playford B) and the November 2015 closure of their associated coal mine at Leigh Creek, in South Australia.⁵¹

Alinta had first foreshadowed these closures in June 2015⁵² saying that the facilities would not operate past March 2018, and in a July 2015 update said⁵³ they wouldn't operate past March 2017.

That within four months of the initial announcement Alinta had brought forward the proposed closure by two years demonstrates how quickly developments can escalate in an industry under pressure.

Altogether, 440 employees lost their job, putting the future of the whole town of Leigh Creek and its 700 residents in question.^{54 55}

After the original June announcement the Greens were quick to spruik renewable opportunities, particularly in relation to a proposed solar thermal plant.⁵⁶ The Port Augusta mayor declared Port Augusta had the potential to be *"the nation's capital of renewable technology,"* and the South Australian premier said that the government had *"already established a taskforce"* and that a *"community engagement team would provide support and advice to regional communities."*⁵⁷

Later in June the mayor added that a multi-million dollar assistance package from the state government would help to entice new jobs to the area.⁵⁸

When in late September Alinta announced⁵⁹ that a solar plant was not commercially feasible, it was reported that the council had an 'advisory group' dealing with the situation and the state manufacturing minister said that government had *"people on the ground...talking to people about their needs and issues."*⁶⁰

51 Alinta Energy, "Flinders Operations Update," 7 October 2015, <https://alintaenergy.com.au/about-us/news/flinders-operations-update>

52 Alinta Energy, "Flinders Operations Announcement," 11 June 2015, <https://alintaenergy.com.au/about-us/news/flinders-operations-announcement>

53 Alinta Energy, "Flinders Operations Closure Update," 30 July 2015, <https://alintaenergy.com.au/about-us/news/flinders-operations-closure-update>

54 ABC News, "Leigh Creek for Sale After Alinta Energy Closes SA Coal Mine," <http://www.abc.net.au/news/2016-01-22/sa-outback-town-leigh-creek-for-sale/7107922>

55 ABC News, "Leigh Creek to be Put Under Control of Outback Communities Authority," 6 June 2016, <http://www.abc.net.au/news/2016-06-06/leigh-creek-outback-communities-authority-takeover/7480778>

56 Australian Greens, "Future is Renewable as Port August Power Plants Close," 11 June 2015, <http://greensmps.org.au/articles/future-renewable-port-augusta-power-plants-close>

57 ABC News, "Alinta Energy to Close Power Stations at Port Augusta and Coal Mine at Leigh Creek," <http://www.abc.net.au/news/2015-06-11/power-stations-port-augusta-alinta-energy/6537814>

58 ABC News, "Port Augusta Mayor Calls for Multi million Dollar Assistance Package," <http://www.abc.net.au/news/2015-06-23/port-augusta-mayor-pushes-assistance-deal-with-alinta-closures/6568272>

59 Alinta Energy, "Solar Thermal Generation in Port Augusta Update, 22 September 2015, <https://alintaenergy.com.au/about-us/news/solar-thermal-generation-in-port-augusta-update>

60 The Advertiser, "Alinta Ends Port Augusta Solar Thermal Study As Coal Fired Power Plants Closure Looms," 23 September 2015, <http://www.adelaidenow.com.au/business/alinta-ends-pt-augusta-solarthermal-study-as-coalfired-power-plants-closure-looms/news-story/dca50575e487003bc222d075a87900c7>

After the 7 October announcement, South Australian Treasurer Tom Koutsantonis said that some workers would be able to join the public service and that Leigh Creek was “*on the doorstep of some of the great tourism attractions.*”⁶¹

One year later, and not much has changed, except that various developers of proposed solar thermal towers are still chasing subsidies in an effort to get their projects off the ground.

On 2 June 2016, US company SolarReserve revealed it needed \$100 million⁶² and government-backed long term power price contracts to build its proposed 110MW⁶³ Port Augusta solar thermal tower.

Around the same time, a different company, Solastor, revealed a proposal for a 170MW, \$1.2 billion solar thermal tower, also at Port Augusta, and that it was seeking support from the Clean Energy Finance Corporation.⁶⁴

The sudden interest by two separate companies in establishing a similarly sized solar thermal facility in the one location may have had something to do with:

- the Federal ALP’s April promise to “invest \$206.6 million in ARENA to support a specific Concentrated Solar Thermal funding round;”⁶⁵
- the then Coalition Environment Minister’s Press Club debate pledge⁶⁶ of support for a Port Augusta solar thermal tower through the Government’s new Clean Energy Innovation Fund; or
- the pledge of the then Shadow Environment Minister at the same Press Club debate that a Port Augusta solar tower would be “front of the queue.”⁶⁷

The battle between these two companies, both competing for the same government subsidies, was detailed in a piece in Renew Economy, also in June.⁶⁸

By September 2016 SolarReserve was claiming it now wanted to build six solar towers in South Australia but made it clear that a 20 year power purchase agreement and a grant to get them built in the first place is still required.⁶⁹

In October 2016, a third company, Reach Solar, was known to be in the mix.⁷⁰

61 The Advertiser, “Alinta Energy to Close Leigh Creek Mine in November,” 7 October 2015, <http://www.adelaidenow.com.au/news/alinta-to-close-leigh-creek-mine-in-nov/news-story/03101245d4c46803965eec6fa2db5fbc>

62 The Advertiser, “Solar Pledges Power Up North’s Solar Plant Plans,” 2 June 2016, <http://www.adelaidenow.com.au/news/south-australia/funding-pledges-power-up-norths-solar-plant-plans/news-story/a4f94a966cef42aab9fe733ffcbbc3bc>

63 Renew Economy, “Solar Reserve Proposes 110MW Solar Tower and Storage Plant for Australia,” 23 February 2016, <http://reneweconomy.com.au/solarreserve-proposes-110mw-solar-tower-and-storage-plant-for-australia-16693/>

64 The Advertiser, “\$1.2bn Solar Thermal Plant in Port Augusta Would Create 700 Jobs,” 6 June 2016, <http://www.adelaidenow.com.au/news/south-australia/12bn-solar-thermal-plant-in-port-augusta-would-create-700-jobs-end-coalfired-plants/news-story/7ee492f2478ce258a8137173314da016>

65 Australian Labor Party, “Labor’s Climate Change Action Plan,” <http://www.laborsclimatechangeactionplan.org.au/>

66 The Advertiser, “Liberals Promise to Help Fund Construction of Port Augusta Solar Thermal Power Station,” 18 May 2016, <http://www.adelaidenow.com.au/news/south-australia/liberals-promise-to-help-fund-construction-of-port-augusta-solar-thermal-power-station/news-story/9fde53f07cdee969d339c69022d88ab0>

67 Ibid.

68 Renew Economy, “Hewson’s Unexplained Attack on Molten Salt Storage for Solar,” 9 June 2016, <http://reneweconomy.com.au/hewsons-unexplained-attack-on-molten-salt-storage-for-solar-34905/>

69 Renew Economy, “Solar Reserve Aims to Build 6 Solar Tower Power Plants in South Australia,” 13 September 2016, <http://reneweconomy.com.au/solarreserve-aims-build-6-solar-tower-power-plants-south-australia-29236/>

70 ABC News, “Solar Energy Developers Attracted to Port Augusta After Power Station’s Closure,” 25 October 2016, <http://www.abc.net.au/news/2016-10-25/solar-energy-developers-flock-to-port-augusta/7962306>

South Australia already has Australia's highest unemployment rate,⁷¹ and most expensive electricity, with electricity futures prices rising further still, after the final closure of Alinta's coal-fired power facilities in early 2016.

Locking in expensive power for years into the future will do little to address either problem.

Companies or technologies that are unable to sell electricity at a price to attract and retain customers shouldn't be in the business of generating or selling electricity.

South Australia has world class gas, oil and uranium reserves, as well as coal, so spending taxpayer money in an effort to engineer alternatives makes no sense.

The private sector should be required to take the risk, and reap the rewards, if indeed their technologies are better suited to a particular market.

7 Hazelwood Closure

On Thursday 3 November, French energy multinational Engie announced that the 1,542 MW Hazelwood power station⁷² and associated coal mine would close in March 2017, a decision that will cost 750 jobs.⁷³

While the Hazelwood announcement had been expected, it was a surprise that Engie also announced that it wanted to sell its 953 MW Loy Yang B power station,⁷⁴ which employs another 200 people,⁷⁵ before the end of 2017.⁷⁶

Together, these power stations represent over 30% of Victoria's electricity, which together with Yallourn and Loy Yang A play a major role in constraining prices in the National Energy Market and supplying reliable baseload power when it is needed, to renewables-rich South Australia and Tasmania.

71 Australian Government, Labour Market Information Portal, Unemployment Rate by State and Territory, September 2016, http://lmip.gov.au/default.aspx?LMIP/LFR_SAFOUR/LFR_UnemploymentRate

72 Engie website, <http://www.gdfsuezau.com/about-us/asset/Hazelwood-Power-Station-and-Mine>

73 Engie Media Release, "Hazelwood to Close in March 2017," 3 November 2016, <http://www.gdfsuezau.com/media/UploadedDocuments/News/Hazelwood%20Closure/Hazelwood%20closure%20-%20Media%20release.pdf>

74 Engie website, <http://www.gdfsuezau.com/about-us/asset/Loy-Yang-B-Power-Station>

75 ABC News, "Hazelwood Power Station: Closure of Plant to Leave Hundreds Jobless," 3 November 2016, <http://www.abc.net.au/news/2016-11-03/hazelwood-power-station-in-victoria-to-close/7987018>

76 Ibid.

The Australian Energy Market Operator (AEMO) report⁷⁷ issued after the Hazelwood announcement also noted that in 2015-16:

- Victoria accounted for 27% of the electricity consumed in the National Energy Market, 86% of which came from brown coal;
- Victorian exports provided 14% of South Australian consumption, 6% of New South Wales' and 6% of Tasmania's; and
- Hazelwood alone produced 22% of Victoria's electricity.

While the ramifications of the Hazelwood closure are still being assessed, it is clear that this will have a major effect on electricity prices and security.

Estimates of increased Victorian electricity prices have already ranged from between 4 to 8%⁷⁸ or 10 to 25%,⁷⁹ and that the closure of Hazelwood would also see electricity price increases in South Australia of an additional 10%.⁸⁰

Shockingly, the AEMO report also revealed that from 2017/18, Victoria would need to rely on imported electricity from Tasmania or New South Wales to deal with extreme summer peak demands.⁸¹

Victoria is estimated to have 430 billion tonnes of brown coal which is "*low in ash, sulphur, heavy metals and nitrogen, making it very low in impurities by world standards,*" and which in parts of Gippsland are close to the surface and up to 230 metres in thickness.⁸² This is enough for hundreds of years of electricity generation.

Considering Victoria's considerable coal and gas resources, that state should be wholly self-sufficient in, and a reliable exporter of, reliable low-cost energy.

- Yet just this year, the Victorian Government has announced:
- the tripling of brown coal royalties in its April State Budget;⁸³
- a new 40% renewable energy target in June;⁸⁴ and
- a renewed gas exploration and development moratorium in August⁸⁵

Its April decision to triple the royalties on brown coal in an effort to gain \$252 million of extra revenue over four years⁸⁶ has already been surpassed by the \$266 million cost of its November

⁷⁷Australian Energy Market Operator, *Market Insight Report: Victoria's Energy Outlook*, November 2016, <http://www.aemo.com.au/Media-Centre/AEMO-Market-insight-report-Victorias-supply-outlook>

⁷⁸ABC News, "Hazelwood Power Station Closure: Electricity Bills Could Rise 8pc," 2 November 2016, <http://www.abc.net.au/news/2016-11-02/hazelwood-closure-will-impact-electricity-pricing-pallas-says/7990306>

⁷⁹News.com.au, "Closure of Hazelwood Power Plant will have a Major Impact," 4 November 2016, <http://www.news.com.au/finance/business/closure-of-hazelwood-power-plant-will-have-a-major-impact/news-story/c61e716c09c2edd8e64efbd056f16ec7>

⁸⁰The Advertiser, "Warning: Closure of Hazelwood Coal-Fired Power Station Could Send SA Electricity Prices up by 10 per cent, 3 November 2016, <http://www.adelaidenow.com.au/news/south-australia/warning-closure-of-hazelwood-coalfired-power-station-could-send-sa-electricity-prices-up-by-10-per-cent/news-story/08c493515e86ef43c001e44e72e5d13e>

⁸¹ Ibid. p.4

⁸²Government of Victoria, Earth Resources website, <http://earthresources.vic.gov.au/earth-resources/victorias-earth-resources/coal>

⁸³ABC News, "Victoria to Raise Royalties for Brown Coal," 25 April 2016, <http://www.abc.net.au/news/2016-04-23/victoria-to-raise-250m-by-increasing-brown-coal-royalties/7352526>

⁸⁴Premier of Victoria Media Release, "Renewable Energy Targets to Create Thousands of Jobs, 15 June 2016, <http://www.premier.vic.gov.au/renewable-energy-targets-to-create-thousands-of-jobs/>

⁸⁵Premier of Victoria Media Release, "Victoria Bans Fracking to Protect Farmers," 30 August 2016, <http://www.premier.vic.gov.au/victoria-bans-fracking-to-protect-farmers/>

⁸⁶Government of Victoria, 2016-17 State Budget, Budget Paper No.3, p.116, <http://budgetfiles201617.budget.vic.gov.au/2016-17+State+Budget+-+BP3+Service+Delivery.pdf>

Latrobe Valley assistance package in the wake of Hazelwood's closure.⁸⁷

It is the decisions of government at a federal and a state level that are putting Australian energy security, as well as the jobs of thousands of people, at risk.

8 This Inquiry Is Asking the Wrong Questions

In a statement when this Inquiry was announced, the Institute of Public Affairs said that it was *"a dangerous political stunt"* and that the *"continuous drip-feed of negative commentary from policymakers... (is) creating an environment where private coal-fired power station operators will be asking themselves what is the point of going on."*⁸⁸

The terms of reference are loaded towards the assumption that coal-fired power stations will close and should close, and only refer in passing to the *"maintenance of electricity supply, affordability and security."*

While this is not wholly surprising given that it is Australian Greens policy for energy generation to be comprised of at least 90% renewables by 2030,⁸⁹ and Australian Labor Party Policy for 50 per cent renewables by 2030,⁹⁰ it does not mean that the terms of reference are appropriately balanced.

In its November 2015 Renew Australia manifesto,⁹¹ the Australian Greens even set out a blueprint for closing fossil fuel power stations over the next fourteen years and its mining policy *"recognizes that mining is incompatible with all other land uses,"* and openly advocates banning all new coal mines.⁹²

Importantly, the terms of reference do not adequately recognize the importance of reliable sources of generation, the evolution of fossil fuel technologies or even if the Paris Agreement will reduce emissions.

It is well documented that renewable electricity is intermittent, and that most jurisdictions with a high renewables footprint depend on backup generation, currently legacy fossil fuel plants, and in an idealistic future some sort of battery technology.

⁸⁷Premier of Victoria Media Release, "Economic Growth Zone to Boost Latrobe Valley Business," <http://www.premier.vic.gov.au/economic-growth-zone-to-boost-latrobe-valley-business/>

⁸⁸Institute of Public Affairs Media Release, "Senate Coal Closure Committee a Dangerous Political Stunt," 12 October 2016, <http://www.ipa.org.au/publications/2562/senate-coal-closure-committee-a-dangerous-political-stunt>

⁸⁹Australian Greens, Renew Australia, November 2015, <http://greens.org.au/renew>

⁹⁰Australian Labor Party, Climate Change Action Plan, <http://www.laborsclimatechangeactionplan.org.au/>

⁹¹Australian Greens, Renew Australia, November 2015, <http://greens.org.au/renew>

⁹²Australian Greens website, "Aims – Mining and Mineral Exploration Including Coal Seam Gas," <http://greens.org.au/policies/natural-resources-forests-mining-fisheries>

However, interconnectors only transport the electricity that has to be generated elsewhere, and batteries only store excess electricity. Interconnectors are also a sham solution when the plants generating the electricity to be carried over the transmission lines are being closed.

They are also expensive.

South Australia’s transmission network operator Electranet released a report on 7 November 2016,⁹³ which identified four options to address that State’s need for reliable baseload power. These options included another connection with Victoria, two with New South Wales and one with Queensland.

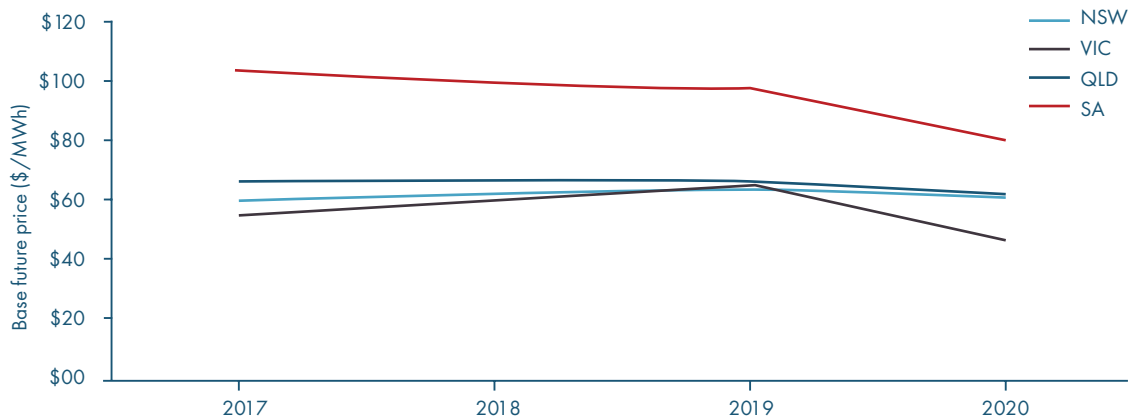
Spending up to \$2.5 billion to build an electricity superhighway which, by the time it was completed would have little traffic, would not be a wise use of resources.

In relation to batteries, Minerals Council of Australia Chief Executive Brendan Pearson recently wrote⁹⁴ that “*all of the batteries made for use in mobile phones, cars, laptops and industry in 2014 would power the world for nine seconds.*” Matt Ridley has also recently pointed out⁹⁵ that the United Kingdom would require 160 million Tesla Powerwalls to cover one day’s consumption.

The necessary technology is just not available at the present time.

This Inquiry should have chosen to look at the impact that the closure of coal-fired power stations has on electricity prices. The chart below, which comes from the aforementioned Electranet report, clearly sets out the difference between likely future prices in South Australia vs New South Wales, Victoria and Queensland.

Figure 3 Electricity Futures Prices in the National Electricity Market – October 2016⁹⁶



Source: ASX Energy website, available at <https://www.asxenergy.com.au>, accessed 19 Oct 2016

⁹³Electranet, *South Australian Energy Transformation*, 7 November 2016, p.31, <https://www.electranet.com.au/wp-content/uploads/resource/2016/11/20161107-Report-SouthAustralianEnergyTransformationPSCR-1.pdf>

⁹⁴The Australian, “All Energy Options Must Be Kept on the Table to Avoid Future Crises,” 6 October 2016, <http://www.theaustralian.com.au/opinion/all-energy-options-must-be-kept-on-table-to-avoid-future-crises/news-story/cbed9f520dd2d8be362cc268cd9b8ba4>

⁹⁵The Australian, “Battery Power Unviable Alternative to Traditional Energy Sources,” <http://www.theaustralian.com.au/news/world/the-times/battery-power-unviable-alternative-to-traditional-energy-sources/news-story/4208d2cf7065c64a2c3d594f4cf04aa8>

⁹⁶Electranet, *South Australian Energy Transformation*, 7 November 2016, p.20, <https://www.electranet.com.au/wp-content/uploads/resource/2016/11/20161107-Report-SouthAustralianEnergyTransformationPSCR-1.pdf>

Interestingly, this chart is based on data as at 19 October, prior to the Hazelwood closure announcement.

Figures from the same ASX Energy page on Wednesday 9 November 2016⁹⁷ suggests that higher Victorian electricity prices are already being factored in:

Base Future Prices Tue 8 Nov 2016				
	NSW	VIC	QLD	SA
2017	64.97	63.40	73.10	104.84
2018	65.54	65.88	69.00	104.00
2019	65.40	64.06	67.26	98.57
2020	63.35	46.22	61.00	79.00

Contrasting futures prices in June 2016 with the situation in June 2015, also reveals the effect of the removal of reliable generating capacity from the National Electricity Market:⁹⁸

South Australia comparative base future prices		
Quarter	June 2015 (\$ per megawatt hour)	June 2016 (\$ per megawatt hour)
Q3 2016	50.75	101
Q4 2016	48.45	84.25
Q1 2017	62.35	92.5
Q2 2017	50	87.75
Q3 2017	50.5	89
Q4 2017	49.25	80
Q1 2018	63.52	100.41
Q2 2018	50.5	95.32

Ironically, coal-fired power station closures in Australia, if they continue, may all be for nothing.

While in coming years a number of domestic policy initiatives will be justified with a reference to the 2015 Paris Climate Change Agreement, in fact this Paris Agreement will not actually reduce emissions.

The United Nations' own 30 October 2015 report on the aggregate effect of national climate pledges⁹⁹ reveals that global emissions will continue to grow over the period to 2025 and 2030.

Putting aside differences of opinion about the effect of increased carbon dioxide levels on global temperatures, even though the Agreement aims to limit global temperature growth to 2 degrees above pre-industrial levels and aspires to hold them to 1.5 degrees, in the unlikely event that all

⁹⁷Source: ASX Energy website, www.asxenergy.com.au, Wednesday 9 November 2016, 6.17pm

⁹⁸Source: Australian Energy Regulator website, South Australia Comparative Base Futures Prices, Thursday 10 November 2016, <https://www.aer.gov.au/wholesale-markets/wholesale-statistics/south-australia-comparative-base-futures-prices>

⁹⁹United Nations Framework Convention on Climate Change, Synthesis Report on the Aggregate Effect of the Intended Nationally Determined Contributions, 30 October 2015, paragraphs 33 and 34, <http://unfccc.int/resource/docs/2015/cop21/eng/07.pdf>

national pledges are honoured, temperatures will still rise by 2.7 degrees by 2100.¹⁰⁰

Even the Climate Council has acknowledged that while countries are legally bound to monitor and report on their emissions, there is *"no legally binding requirement for nations to cut emissions at specific levels."*¹⁰¹

9 Local Jobs and The Role of Unions

The Latrobe Valley has Victoria's highest unemployment rate at 8.1 per cent¹⁰² compared to Melbourne's Inner South and Outer East (4.4%)¹⁰³ and the overall Victorian rate of 5.7%.¹⁰⁴

Yet the Australian Council of Trade Unions issued a media release welcoming this Inquiry¹⁰⁵ and called for a plan that *"ensures that Australia's transition to a clean energy economy occurs in a fair and equitable way"* that *"creates new secure opportunities for workers..."*

This theme was repeated, together with the word "change," "changes," "changing" or "transition" in every sentence of this short document.

Rather than just accepting the demise of what is still currently the lowest cost form of reliable energy, and adding its voice to the chorus that aims to convince the public that a plan is all that is needed, the ACTU should instead be working with its affiliates to protect existing local jobs.

In the wake of the Hazelwood decision, speculation has increased about the future of energy-intensive businesses that rely on cheap affordable and reliable electricity.

The head of Alcoa Australia recently said that *"Australia is losing its competitive advantage when it comes to energy"* and that *"it was access to long-term, competitively priced base-load energy supplies that enabled Alcoa to build an integrated aluminium industry in Australia."*¹⁰⁶

The Chief Executive of Boral also said that the *"cost of energy in Australia is among the highest in the world for domestic manufacturers."*¹⁰⁷

100 Climate Action Tracker, "Climate Pledges Will Bring 2.7 Degrees of Warming: Potential for More Action, 8 December 2015, <http://climateactiontracker.org/news/253/Climate-pledges-will-bring-2.7C-of-warming-potential-for-more-action.html>

101 Climate Council, Your Top 5 Questions About the Paris Climate Change Agreement Answered, 18 December 2015, <https://www.climatecouncil.org.au/your-top-5-questions-about-the-paris-climate-agreement-answered>

102 Australian Government, Labour Market Information Portal, Victoria – Unemployment Rate by Labour Force Region, http://lmip.gov.au/default.aspx?LMIP/LFR_SAFOUR/VIC_LFR_LM_byLFR_UnemploymentRate

103 Ibid.

104 Australian Government, Labour Market Information Portal, Unemployment Rate by State and Territory, http://lmip.gov.au/default.aspx?LMIP/LFR_SAFOUR/LFR_UnemploymentRate

105 Australian Council of Trade Unions Media Release, "Just Transition: A Fair Way forward for workers in changing industries," <http://www.actu.org.au/actu-media/media-releases/2016/just-transition-a-fair-way-forward-for-workers-in-changing-industries>

106 The Australian, Alcoa, Boral, Warn of Challenges as Engie Pulls Plug on Hazelwood, 4 November 2016, <http://www.theaustralian.com.au/business/mining-energy/alcoa-boral-warn-of-challenges-as-engie-pulls-plug-on-hazelwood/news-story/f27b39867491d8436371154bb359dffa>

107 Ibid.

Brickworks Chief Executive Lindsay Partridge described the reduction in affordable baseload power as *"like the governments' policy is they want to wipe manufacturing out" and "(Y)ou get more sense talking to your hand than talking to governments."*¹⁰⁸

The Chief Executive of CSR has also said that Australia had an historic energy advantage because *"we had the best coal assets and the best gas assets" and that's "fundamentally been flipped on its head and that makes manufacturing less competitive globally than it was."*¹⁰⁹

Yet one of the major power station unions, the CFMEU, also issued a statement¹¹⁰ calling for a national plan to assist with the transition to so-called 'clean energy' while at the same time pursuing industrial action at a third Victorian brown coal power plant, AGL's Yallourn.¹¹¹

It is disappointing that the trade union movement seems more concerned with implementing transition plans and going on strike, than it is with fighting to protect local jobs.

108 Australian Financial Review, "Brickworks' Lindsay Partridge: Hazelwood Loss Depressing," 2 November 2016, <http://www.afr.com/news/brickworks-partridge-hazelwood-loss-depressing-20161101-gsfzuj>

109 Ibid.

110 CFMEU Media Release, "Closure of Hazelwood Highlights Need for Immediate National Plan for Just Transition," 3 November 2016, <https://www.cfmeu.org.au/news/closure-hazelwood-highlights-need-immediate-national-plan-just-transition>

111 AGL Media Release, "Union Action Takes State Closer to Power Disruption," 31 October 2016, <https://www.agl.com.au/about-agl/media-centre/article-list/2016/october/union-action-takes-state-closer-to-power-disruption>

10 Preferred Solution

Rather than contemplating the *“policy mechanisms to encourage the retirement of coal-fired power stations from the National Electricity Market”* the Committee should be looking at ways to support energy security and consumer choice in a way that doesn’t discriminate against any generating technology.

While it is easy to sell false hope to regional communities about opportunities in solar and wind power and the need for ongoing transition plans, there are two, more practical options.

Preferred Solution

A preferred policy solution is for governments to retreat from the micromanagement of the National Electricity Market, and allow it to actually work.

Federal and State Parliaments should immediately abolish the Renewable Energy Target, Clean Energy Finance Corporation, Australian Renewable Energy Agency and all other forms of taxpayer support for ‘preferred’ energy technologies, including state renewable energy targets.

The role of government should be limited to acting as a guardian of competition, and actor of last resort in the event of market failure.

In a subsidy-free energy pricing environment it is likely that solar and wind power prices may rise at least in the short to medium term. Residential and business consumers who are prepared to pay higher prices as their contribution to tackling climate change should not be prohibited from doing so.

In time, improvements in renewable energy technology may very well make these energy sources more cost-effective than fossil fuels, at which time they would be welcome to supplant these generators in the market.

Changes in technology and genuine consumer preferences should be the drivers of the products that are available in Australia’s energy market, as they are in most other markets.

Second-Best Solution

In the event of no policy maker appetite to remove government from most energy market supply decisions, a second-best solution would be for the abolition of the Renewable Energy Target, together with a requirement that major generators must be able to provide secure and reliable electricity when the market needs it – i.e. 24 hours a day, 7 days a week.

This would ensure that the cost of filling gaps in intermittent renewable generation are taken into consideration when pricing renewable output.

There is potential for this to be implemented in conjunction with requirements for realistic carbon dioxide emissions reductions in the order of 30 percent from an agreed baseline.

The policy intention should be to as far as possible guarantee a reliable national supply of

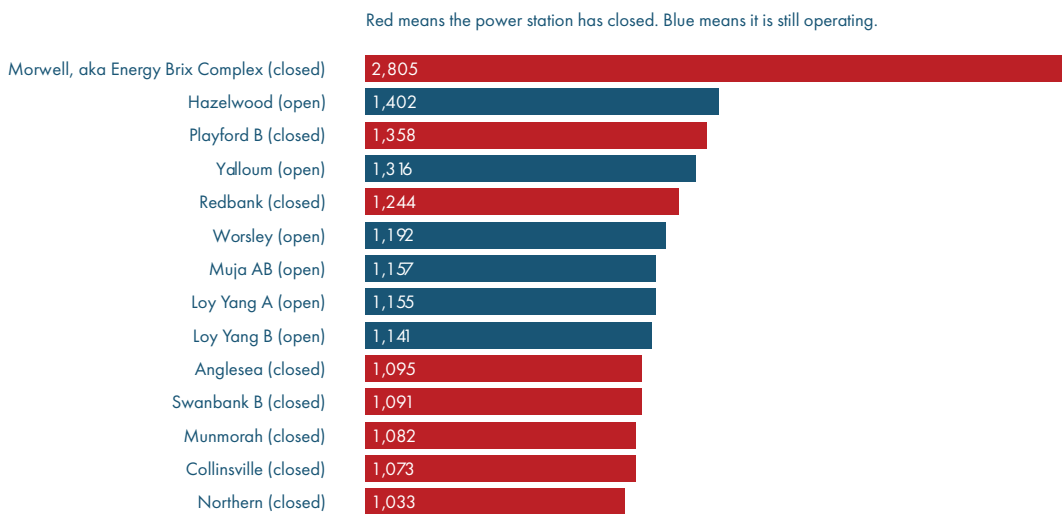
electricity that doesn't discriminate against new or different energy technologies.

With particular reference to Victoria, right now in Europe and in Asia, brown coal ultra-supercritical power stations are in operation or being built, that offer the opportunity to considerably reduce emissions while maintaining reliable supply.

Carbon dioxide emissions at the Neurath brown coal power plant in Germany have been reduced to only 1,031 tonnes of carbon dioxide per gigawatt hour¹¹² (TCO₂/GWh) and at Niederaussem in Germany 933 TCO₂/GWh¹¹³ as generating units have been upgraded.

This compares favourably with Australia's most 'emissions intensive' coal-fired power stations as featured in a recent piece in The Conversation:¹¹⁴

Figure 4 Australia's most emissions-intensive coal power stations



Note: Values are expressed in tonnes of carbon dioxide equivalent per gigawatt hour of energy produced. The figures are the result of adding Scope 1 value to the Scope 3 value, using data from the updated 2016 ACIL Allen report. Some would exclude Worsley from this list, as it is a cogeneration facility, and combine the average emissions intensity of Muja AB with its co-located Muja C and D facilities. Looking at it this way would reduce its overall emissions intensity.

Utilising this technology would allow brown coal to continue to be used in Latrobe Valley Power Stations for the foreseeable future. This would be a better option than outright closure.

Using this technology to build or upgrade NSW and Queensland black coal power plants could result in CO₂ emissions per gigawatt hour of electricity of 670 to 800 tonnes.¹¹⁵

An overall policy approach that prioritises supply security may also encourage the development of Australia's first nuclear power station, an ideal location for which would be in South Australia. Australia is said to enjoy around 30 per cent of the world's uranium – much of which is located in, or in close proximity to, that state.

112 Enerpedia, Neurath Powerplant, http://enipedia.tudelft.nl/wiki/Neurath_Powerplant

113 Enerpedia, Niederaussem Powerplant, http://enipedia.tudelft.nl/wiki/Niederaussem_Powerplant

114 The Conversation, "Have Eight of Australia's Twelve Most Emissions Intensive Power Stations Closed in the Last Five Years?" 15 September 2016, <https://theconversation.com/factcheck-have-eight-of-australias-12-most-emission-intensive-power-stations-closed-in-the-last-five-years-65036>

115 World Coal Association, *High Efficiency Low Emissions Coal* fact sheet, http://www.worldcoal.org/file_validate.php?file=Hele%20Factsheet%20landscape.jpg

One option could be to work with BHP Billiton on a nuclear power station that could also reliably power its Olympic Dam mine,¹¹⁶ as well as feed reliable electricity into the South Australian grid.

Another option could be the nuclear power that works in conjunction with a proposed South Australian nuclear waste disposal facility as referenced in proposals submitted to the recent Nuclear Fuel Cycle Royal Commission.¹¹⁷

Maintaining electricity security, supporting regional employment and reducing carbon dioxide emissions are all possible if technologies are not excluded from the future national energy mix.

¹¹⁶ Australian Financial Review, "BHP Billiton Calls for SA Gas Power Back," 21 October 2016, <http://www.afr.com/news/bhp-billiton-calls-for-sa-gas-power-back-20161021-gs7lgm>

¹¹⁷ Australian Academy of Technological Sciences and Engineering, Submission to the South Australian Nuclear Fuel Cycle Royal Commission, August 2015, p.36 <https://www.atse.org.au/Documents/submissions/sa-nuclear-fuel-cycle-royal-commission.pdf>

11 Conclusion

Electricity systems exist to provide safe, reliable and affordable power to consumers and to businesses. The role of government should only be to support competition and private sector innovation in energy markets.

When the production of economically viable electricity can also support the employment of thousands of people, particularly in regional Australia, this is a genuine win-win.

The international market for both thermal and metallurgical coal is strong, and is likely to remain so for many decades yet. Artificial regulatory actions to curtail Australian coal mining and electricity generation will do nothing to change demand for either commodity or even to reduce global carbon dioxide emissions.

While the current international political climate favours so-called 'action on climate change,' conventional political wisdom is often turned on its head, as 2016 has shown with the decision of the United Kingdom to leave the European Union and the election of Donald Trump as President of the United States.

Indeed, if President-elect Trump implements his energy-related election promises and proceeds with his preferred candidate to head the Environment Protection Agency transition team,¹¹⁸ change may come a lot sooner than many may think.

Coal mining, electricity generation, farming and other industries can co-exist as they have done in eastern Victoria for many decades.

Short of major technological breakthroughs which revolutionise the production of electricity and reduce international demand for steel, even if policy makers are successful in shutting down Australia's coal industry in the short to medium term, it is likely to return, driven by the ever-present need for reliable power and durable building materials.

It is just a terrible shame that so much economic and social damage will have been done in the mean-time.

¹¹⁸ Environment and Energy Daily, "Trump Picks Top Skeptic to Lead EPA Transition," 26 September 2016, <http://www.eenews.net/stories/1060043378>

