Submission No 244

INQUIRY INTO ELECTRICITY SUPPLY, DEMAND AND PRICES IN NEW SOUTH WALES

Organisation: NSW Minerals Council

Date Received: 19 June 2018

LEGISLATIVE COUNCIL SELECT COMMITTEE

INQUIRY INTO ELECTRICITY SUPPLY, DEMAND AND PRICES IN NEW SOUTH WALES

SUBMISSION

June 2018

NSW MINERALS COUNCIL

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Executive summary

New South Wales should develop its own energy strategy, as recommended by the NSW Energy Security Taskforce, to expertly monitor risks to the reliability and affordability of electricity to NSW customers and to inform timely action for risk management.

The NSW minerals industry is centrally placed in the debate about the state's electricity supply, being a major consumer of electricity; the supplier of coal that fuels around 80% of the state's electricity supply; and a supplier of minerals that are used to manufacture renewable energy infrastructure such as wind turbines, solar panels and batteries.

The NSW Minerals Council's (NSWMC's) members have significant concerns about the affordability of electricity both now and in the future. The mining industry, like other industrial users of electricity, is a large employer and economic contributor that relies on affordable energy to run operations efficiently and remain internationally competitive. As the ACCC has stated, *"there is a severe electricity affordability problem across the NEM and the price increases over the past ten years are putting Australian businesses and consumers under unacceptable pressure."*[1]

There are concerning aspects to both major parties' energy policies in NSW that could exacerbate the problems currently being faced. The Government lacks any specific energy policy for commercial and industrial users and largely defers to Commonwealth processes. While this is a theoretically sensible approach, the reality is much different with much uncertainty remaining at the Commonwealth level and our neighbouring states pursuing their own agendas that could have direct impacts on NSW.

The Government's aspirational target of achieving net zero emissions across NSW by 2050 has been described by the University of Queensland Energy Initiative as *"an exercise in heroic futility"* given the target is more ambitious than the most ambitious international targets; will have no measurable impact on the global climate; is an enormous task; comes with no guarantee that major international emitters would follow NSW's net zero example; and will weigh down the NSW economy with massive costs.

The NSW Labor Party's position of aligning with Federal Labor's 50% renewable energy target is concerning. The Federal Renewable Energy Target played a role in the current volatility, bringing forward the closure of existing reliable, affordable and dispatchable generation as it forced new generation capacity into the system. The direct subsidies and cross-subsidies, largely paid by electricity consumers to both large scale renewable energy developers and participating households for rooftop solar, have been calculated as $2.95 billion in 2015-16.[2] To put this figure into perspective, the total annual revenue across the NEM in FY2015-16 was $11.4 billion, up from $8 billion in 2014-15 rising to over $17 billion in FY2016-17.

Despite this previous experience, even more ambitious renewable energy targets are being proposed and implemented, including in our neighbouring states of Queensland and Victoria, which will force more new capacity into the NEM. If similar policies were implemented in NSW there is the potential for serious economic and social dislocation in regions such as the Hunter Valley.

NSW is only in the initial stages of the much-discussed energy transition, with traditional forms of energy (coal, gas and Snowy Hydro) still generating more than 90% of the state's electricity. However,

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[1] ACCC Retail Electricity Pricing Inquiry Preliminary Report, September 2017, https://www.accc.gov.au/system/files/Retail%20Electricity%20Inquiry%20-%20Preliminary%20report%20-%2013%20November%202017.pdf

[2] Sabine Schnittger and Brian S. Fisher, *Primer on renewable energy subsidies in Australia*, BAEconomics, Canberra, January 2017, http://www.baeconomics.com.au/wp-content/uploads/2017/02/MCA-renewables-subsidies-8Jan2017-2.pdf

with the planned retirement of large coal fired generators fast approaching, NSWMC has questions as to whether NSW is adequately prepared to ensure lost capacity is replaced with reliable – and particularly affordable – supply.

While wind and solar are among the least-cost form of emissions reductions in the early stages when their market share is low, their integration costs increase exponentially as the required storage and backup generation requirements increase and maintaining system security becomes ever more challenging. Coal with carbon capture and storage is expected by some modellers to play an important role as much deeper cuts in the electricity system emissions are sought. Bioenergy with carbon capture and storage (BECCS), or some other negative emissions technology, will also be crucial if NSW is to have any chance of achieving the NSW Government's aspirational target of net zero emissions by 2050.

While NSWMC – and virtually every other organisation – supports a nationally consistent approach to energy and climate policy, the reality is that hopes for a truly national approach are looking increasingly unlikely given moves by other states to implement their own policies.

Similarly, while the 'technology neutral' and 'market based' catchphrases are ubiquitous, the energy policies of nearly every government and political party fall well short of these worthy principles, with renewable energy targets, reverse auctions, bans on nuclear energy, Snowy Hydro 2.0 and South Australia's investment in generation and storage infrastructure all undermining these principles.

In these circumstances, it is important that the NSW Government develops its own energy strategy, as recommended by the NSW Energy Security Taskforce, to ensure it is aware of risks to the reliability and affordability of electricity for NSW consumers and is in a position to manage any risks if needed.

1 Background

1.1 The Committee's Terms of Reference

The Select Committee's Terms of Reference are outlined below:

> *1. That a select committee be established to inquire into and report on electricity supply, demand and prices in New South Wales, and in particular:*
>
> *(a) the reasons for recent large increases in the price of electricity,*
>
> *(b) the impact of the deregulation of electricity prices in 2014,*
>
> *(c) alleged collusion and price gouging by energy retailers,*
>
> *(d) the effectiveness or impact of any current regulatory standards and guidelines,*
>
> *(e) options for future government oversight and responsibility in the re-regulation of electricity prices,*
>
> *(f) the adequacy of planning to meet future electricity demand, including utilising high efficiency, low emissions coal technology as well as the use of nuclear, gas, solar and wind energies, and energy storage through batteries, pumped hydro and hydrogen, and improved transmission between regions,*
>
> *(g) the adequacy of programs to assist low income earners, pensioners and senior card holders to afford electricity as well as the impact of additional fees, such as late payment fees, included in energy bills, and*
>
> *(h) any other related matter.*
>
> *2. That the committee report by the last sitting day in November 2018.*

There have been multiple reports into the electricity system by a range of bodies in recent years that cover many of these issues. This submission will touch on some of these issues but largely focus on (f).

1.2 The minerals industry's role in the energy debate

The NSW minerals industry is centrally placed in the energy policy debate, being involved in both the supply and use of electricity and related infrastructure in NSW.

The coal mines in the Western, Newcastle and Hunter Valley coalfields supply thermal coal to Mt Piper, Bayswater, Liddell, Eraring and Vales Point coal fired power stations, which together form the backbone of the state's electricity supply, generating around 80% of the state's electricity.

On the demand-side of the market, the minerals industry is a large user of electricity. The industry consumes 9%[3] of the state's electricity and the price increases in recent years have had a significant impact on mining operations. Metalliferous operations in particular use significant quantities of electricity in ore processing plants and have faced enormous increases in electricity bills.

Wholesale electricity prices in New South Wales more than doubled in recent years: from an annual demand-weighted average wholesale price of $36/MWh in 2014-15 to $55 in 2015-16 to $88 in 2016-17, with almost no change in annual electricity demand in NSW. The wholesale revenue pool in the NSW region has increased over the same three financial years from $2.5 billion to $3.8 billion to $6.2 billion. Prices continued to increase in the current financial year: the NSW wholesale market in calendar 2017 was $7.2 billion. Wholesale price increases flow through to customers albeit with some lag for customers on annual contracts. Nevertheless, NSWMC members have been paying a share of

[3] Office of the Chief Economist, Australian Energy Statistics 2017, Table F

the additional four to five billion dollars of revenues for electricity generation. The increases come on top of a decade of network price increases, and adversely affect the competitiveness of NSW industry.

The industry also produces raw materials used in the production of renewable energy infrastructure such as wind turbines, solar panels and batteries. Some of the minerals currently or planned to be produced in NSW include coking coal for steel manufacturing, cobalt and nickel for batteries and copper for electrical components. Those materials are supplied to renewable energy equipment manufacturers through highly competitive international commodity markets. A price-competitive and reliable 'industrial strength' electricity supply is as vital an input for the production of minerals destined for renewable energy generation equipment as it is in any other industry.

NSWMC's members therefore view the issues from several angles and NSWMC's position reflects these broad perspectives.

1.3 The NSW Minerals Council's principles for energy policy

NSWMC promotes the following principles in energy policy:

- **Implement what works, not just what seems popular** – the electricity system is complex and evolving. It is not as simple as choosing between traditional forms of generation and renewable generation. Each technology has its pros and cons and there are many other aspects to the system that need to be considered.
- **Take a technology neutral, market-based approach** – while being 'technology neutral' and 'market based' are common mantras in today's debate, the reality is much different. Renewable energy targets continue to effectively subsidise select forms of low emission generation; the Federal Government is investing billions of dollars in Snowy 2.0; the South Australian government is funding new generation infrastructure with unknown costs. Ideally the market should be making investment decisions based on clear and long-term policy settings that do not discriminate between technologies.
- **Consider total electricity system costs** – the Levelised Cost of Electricity (LCoE) is often used to compare the relative costs of different generation technologies such as coal and solar, however it is entirely inappropriate for this purpose. The full system costs need to be included in any analysis including distribution costs, electricity system support services (frequency control, voltage control, inertia, system re-start) and firming costs for backing up variable renewable energy generators, which are weather dependent and can go for extended periods only generating nominal amounts of electricity.
- **Take a national approach, rather than individual state policies** – an integrated national approach to energy and climate policy will deliver electricity and emissions reductions most efficiently. There remains a complex array of individual state policies and schemes that should be abolished in favour of a truly national approach, or otherwise risk distorting and complicating the system and incurring higher costs. At the same time, support for a national approach should not override the necessity to develop a state-focussed strategy for the expert risk monitoring and management of the state power system recommended in this submission.
- **Support low emissions coal technology research and development** – if NSW is to have any hope of achieving the net zero emissions aspirational target set by the NSW Government it will require large scale carbon capture and storage not only for coal but also for other emission sources. Modelling indicates that for deeper cuts in emissions at later stages of the transition to a low emissions electricity system, carbon capture and storage is critical. Research and development of low emissions technology for NSW is needed, including the continued support of the NSW Coal Innovation program established by the former Labor Government and continued under the Coalition Government.

2 The energy supply mix in NSW

2.1 The changing energy supply mix

Coal fired power generation has long formed the backbone of the state's generation mix and continues to supply more than 80% of the state's electricity[4]. It has, and continues to, support major industrial users with affordable, reliable electricity including mining and minerals processing operations.

With coal, gas and Snowy Hydro dominating electricity supply in NSW, the penetration of wind and solar in NSW has remained low and the network integration problems experienced in South Australia have not been felt to the same extent.

However, there has been a tightening of the electricity market, particularly during summer peak periods, due to the withdrawal from service of around 5 466 MW of thermal capacity from the NEM since 2011[5]. To date, the ability of renewables to contribute to peak demand is variable, since critical summer peak demand tends to occur on calm weekday evenings during a heat wave, when wind contribution is low and solar contribution is dropping off rapidly.

Further retirements of coal fired generators are planned over the coming decades, beginning with Liddell in 2022. This withdrawal of capacity will require careful planning to ensure there will not be disruptions to the state's electricity supply and that the total system costs of replacement capacity are minimised. AEMO has estimated that the planned withdrawal of Liddell in 2022 AEMO will create a 1000 MW supply shortfall. While AGL has announced its plan to replace Liddell, AEMO has found that there will by an 850 MW shortfall in dispatchable power and that *"There remains a high risk of load-shedding following the closure of Liddell. Specifically, the analysis shows that once in every three years approximately 200,000 households in NSW may experience power outages lasting five hours."*

NSWMC's members are concerned with the lack of certainty about plans to replace planned generator retirements. The scale of the task is significant and the ability of renewables and storage technologies to replace lost capacity both reliably and cost effectively remains to be seen. The stakes are very high.

Drawing on recent experience to provide some practical perspective on the capacity numbers noted above: on 10 February 2017, the NSW system experienced a Lack of Reserve (LOR) level 3 condition for more than 90 minutes. LOR 3 is the most severe level, in which "involuntary load shedding has commenced or is imminent to maintain or restore power system security." [6] Reserves were smaller than the largest unit of the system and substantial large loads (the Tomago aluminium smelter) were already curtailed. The system is not considered secure under those conditions and is vulnerable to a cascading blackout. Such events lead to hundreds millions of dollars damage to industrial facilities such as smelters (as happened at Portland in Victoria). The South Australian blackout caused economic losses measured in the hundreds of millions of dollars. A state-wide blackout in NSW would be expected to cause damage in excess of one billion dollars, including significant financial damage to NSWMC members. That damage would fall on employees, taxpayers and shareholders in NSW.

2.2 The role of renewables

Renewables are playing a small but growing role in the state's energy mix, having been subsidised through the Renewable Energy Target and now being mature technologies whose costs have fallen considerably.

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[4] National Energy Emissions Audit, February 2018
http://www.tai.org.au/sites/defualt/files/NEEA%20Electricity%20Update%20February%202018.pdf
[5] Retirements include 2756 MW of brown coal in South Australia and Victoria, 2380 MW of black coal in NSW and Queensland, of which 1710 MW was in NSW, and 240 MW of gas-fired steam turbines in Tasmania, plus another 480 MW of gas-fired steam turbines in SA essentially out of operation).
[6] AEMO, *System Event Report New South Wales—10 February 2017*, published 22 February 2017

While the falling cost of solar and wind generation has been widely reported, there is less discussion about the impact these forms of generation have on the reliability and security of the electricity system, as highlighted by the Australian Energy Market Commission.[7] Solar and wind energy is not dispatchable; i.e. it cannot be produced on demand – only when weather conditions are suitable. Wind farms only generate around a third of their nameplate capacity on average, and for solar PV the annual average capacity utilisation is in the 20 to 25% range. However, output fluctuates widely and to manage these fluctuations wind and solar need to be supported by storage or some other form of backup generation. Exacerbating the problem, it turns out that there is a degree of negative correlation between electricity demand on the one hand and wind and solar generation on the other. This can be observed in the half-hourly data. In particular, at times of high demand (typically hot summer evenings), wind and solar generation fall off as demand is rising, and make almost no contribution to meeting the peak. The economic and system value of the capacity is negligible.

Looking beyond peak demand times, extended wind droughts are not uncommon, so any electricity system reliant on a significant proportion of wind capacity will require large backup and/or storage capacity. The June 2017 wind drought in South Australia has been widely reported, with output from South Australia's wind farms around half that of June 2016 despite an increase in installed capacity[8]. Analysis of NSW weather patterns over 2006-2015 show 15 wind droughts lasting more than 1 week in duration and a 1-in-5-year drought lasting 12 days.[9] This phenomenon, and the analogous conditions of numerous consecutive cloudy or rainy days, particularly in winter when solar radiation is already low, present the greatest engineering and economic challenge for electricity storage.

Conversely, during favourable conditions for wind generation, the stability of the electricity system can be compromised. This has triggered AEMO to direct high cost open cycle gas turbines to come online in South Australia to maintain system strength, even at times when wind generation exceeds demand. Victoria is then called on to absorb the excess generation. This arrangement can work because South Australia's power system is small, and Victoria's is large. It would create major problems if the South Australian approach was extended to Victoria and/or New South Wales and scaled up proportionately.

Having 'cannibalised' thermal plant revenues and driven coal plants to close, wind is now cannibalising its own revenues. This reflects the rapidly diminishing economic and market value of wind and solar as their share of generation increases, which has been recognised in the literature for at least five years. Hirth (2013) for example, found that the 'competitiveness gap (required subsidy)' increased materially with generation market share, more than cancelling out the learning effect observed in falling unit capacity costs. The paper contains a comprehensive discussion of the market value of variable renewable energy (VRE), and the abstract provides a good summary of the problem:

> *The inherent variability of wind speeds and solar radiation affects the price that VRE generators receive on the market (market value). During windy and sunny times the additional electricity supply reduces the prices. Because the drop is larger with more installed capacity, the market value of VRE falls with higher penetration rate. This study aims to develop a better understanding on how the market value with penetration, and how policies and prices affect the market value. Quantitative evidence is derived from a review of published studies, regression analysis of market data, and the calibrated model of the European electricity market EMMA. We find the value of wind power to fall from 110% of the average power price to 50–80% as wind penetration increases from zero to 30% of total electricity consumption.*

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[7] Reliability Panel AEMC, Annual Market Performance Review 2017, https://www.aemc.gov.au/sites/default/files/2018-03/Final%20report.pdf

[8] McCardle, P., Where's the wind gone? NEM-wide wind farm operation lowest in 5 years (maybe ever, on like-for-like basis?), WattClarity, 30 June 2017 http://www.wattclarity.com.au/2017/06/wheres-the-wind-gone-nem-wide-wind-farm-operation-lowest-in-5-years-maybe-ever-on-like-for-like-basis/

[9] Boston, A., Bongers, G., Byrom, S., and Staffell, I. (2017) Managing Flexibility Whilst Decarbonising Electricity – The Australian NEM is Changing, Gamma Energy Technology http://anlecrd.com.au/wp-content/uploads/2017/07/Managing-Flexibility-NEM-2017-Report.pdf

For solar power, similarly low value levels are reached already at 15% penetration. Hence, competitive large-scale renewable deployment will be more difficult to accomplish than as many anticipate.[10]

The problem is not merely a market design problem—as some observers have claimed—but reflects a basic underlying engineering and economic problem characteristic of these resources. It is clear that as variable renewable capacity expands, it must be paired with reliable backup generation and storage, which can significantly increase the total system costs of integrating these forms of generation.

2.3 The role of low emissions coal fired power generation

New high efficiency, low emissions (HELE) coal fired power stations are being constructed around the world and can reliably deliver electricity on demand virtually 24 hours a day at competitive costs.

A 2017 independent study by Solstice Development Services and GHD engineers on generation costs concluded a large HELE plant had the capability to deliver the lowest cost 24 hour per day electricity, from $40/MWh or a mid-point price of $59/MWh.[11]

The US Energy Information Administration recently published an article[12] summarising new coal fired power generation capacity being constructed or planned in the Middle East – a total of 41,000 MW of capacity. While noting the Middle East situation is not directly transferrable to Australia, an Australian Energy Council article converted the Levelised Cost of Electricity for some projects into Australian dollars[13]:

- Dubai's Hassyan Project – a 3.6 GW ultra-supercritical coal fired power station, with the initial 2.4 GW expected to become operational between 2020 and 2022 and another 1.2 GW expected to come online in 2023. The consortium building the plant bid a Levelised Cost of Electricity equivalent to A$59/MWh based on 2015 coal prices and 95% availability.
- Egypt's planned Hamarawein project – a 6.6 GW supercritical plant planned to become operational in 2023-24 with a Levelised Cost of Electricity equivalent to A$71/MWh.

Supercritical and ultra supercritical technology could deliver the same amount of electricity as the existing NSW coal fired generation fleet but with approximately 30% lower emissions.

Deeper cuts in emissions from coal would require carbon capture and storage (CCS). Modelling undertaken for the Australian National Low Emissions Coal Research and Development (ANLEC R&D)[14], which is funded by industry and the Australian Government, demonstrates the role that CCS plays as deeper cuts in emissions are sought in the electricity system. While renewables provide the initial least-cost emissions reductions, their integration costs increase exponentially as they are deployed more broadly. The study indicates the lowest cost pathway for emissions reductions, while at the same time ensuring the stability of the grid, involves a mix of technologies beginning with renewables, then moving to gas, then either coal or gas with CCS.

CCS will also be essential if NSW is to have any hope of achieving the aspirational target of net zero emissions by 2050 set by the NSW Government. Given there is a range of emission sources for which there is no feasible way to eliminate emissions (e.g. agriculture), negative emissions will be required.

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[10] Lion Hirth (2013) The market value of variable renewables: the effect of solar wind power variability on their relative price, Energy Economics 38 pp. 218–236
[11] Solstice Development Services (2017), Prospects for a HELE USC Coal-fired Power Station, http://www.minerals.org.au/file_upload/files/reports/HELE_PS_Prospects_-_Desktop_Study_FINAL.pdf
[12] US Energy Information Administration (2018), Countries in and around the Middle East are adding coal fired power plants, https://www.eia.gov/todayinenergy/detail.php?id=36172
[13] MacKinnon, D. (2018), Coal, but not forgotten, https://www.energycouncil.com.au/analysis/coal-but-not-forgotten/
[14] Boston et al, Managing Flexibility Whilst Decarbonising Electricity

The University of Queensland Energy Initiative's analysis indicates that while land based offsets (i.e. tree planting) may provide some of this sequestration, there is insufficient land in NSW to meet the task. Measures such as biomass burning with CCS will be needed.[15]

While CCS is a proven technology, having been used in enhanced oil recovery operations for decades, its application in NSW needs ongoing support. Further efforts to identify the best geological storage sites for NSW should be made so CCS can be implemented as it becomes a viable option in future.

[15] University of Queensland Energy Initiative (2016), *The NSW Climate Change Policy Framework – important considerations for taking the aspirational goal seriously. A public interest discussion paper*.

3 Policy considerations for NSW

3.1 Current policies of the major parties in NSW

There are concerning aspects to both major parties' energy policies in NSW that could exacerbate the affordability and reliability problems currently being faced.

3.1.1 NSW Government

The NSW Government needs to provide evidence of a comprehensive energy policy to handle changes in the National Electricity Market and ensure NSW commercial and industrial users will have access to reliable and affordable electricity.

The NSW Government largely defers to the COAG processes, aiming for a national approach to energy and climate policy. While this is a theoretically sensible approach, the reality is much different. The National Energy Guarantee is not yet settled and our neighbouring states are pursuing their own agendas. Victoria has legislated a renewable energy target of 25% by 2020 and 40% by 2025, while Queensland has a renewable energy target of 50% by 2030. These policies, in states with interconnections to NSW, will have direct consequences for NSW energy consumers and the NSW generation fleet as they flood the market with new capacity, potentially forcing out existing assets.

The NSW Government's aspirational target of achieving net zero emissions across NSW by 2050 has been described by the University of Queensland Energy Initiative (UQEI) as *"an exercise in heroic futility"* given the target is more ambitious than the most ambitious international targets; will have no measurable impact on the global climate; and will weigh down the NSW economy with massive costs.

Net zero emissions would require the complete decarbonisation of the electricity grid, which poses massive challenges. The reliability of electricity supply is of paramount importance. UQEI observes:

> *Reliability, stability and the importance of sufficient available capacity to meet peak demand from the generation level through the transmission grid to distribution networks are non-negotiable requirements for the provision of electricity as an essential service. The economic principle that 'there is no such thing as a free lunch' applies. Technologies that drive down emissions without driving up costs inevitably sacrifice supply reliability. Maintaining supply reliability while driving down emissions inevitably drives up costs.*
>
> *This has been vividly demonstrated in South Australia's "market meltdown" and "statewide blackout" which are clearly linked to the weakening of the main power system due to the increased penetration of intermittent renewables driving the permanent and temporary closures of conventional synchronous generators. With an average renewable penetration of 40%, the SA power system lacked the resilience to maintain synchronism with Victoria across the Heywood interconnection following minor contingencies, and then immediately collapsed.*
>
> *No investigations have been made of the robustness of the future NSW power system under the Zero emission scenario to withstand every-day contingencies, however it is almost certain that it would lack the necessary robustness, unless very large investments are made in transmission and synchronous generation sources. These additional integration costs could well exceed the additional costs of the renewables generation resources themselves, making the attainment of renewable penetration greater than 40% unattainable from a cost and reliability perspective. (pp16-17)*

There are no feasible means to reduce CO_2 emissions in some sectors like heavy industry, agriculture and heavy transport and emissions from these industries would therefore need to be offset either by negative emissions or perhaps by purchasing international permits. The UQEI analysis makes clear the mathematical impossibility of using just carbon sequestration via tree planting to offset remaining CO_2 emissions, concluding that offsetting unavoidable emissions would require *"80 million Ha to offset 35 years of unavoidable emissions, which is the entire land area of NSW."*

As a result, re-afforestation alone will not be sufficient to offset unavoidable NSW CO_2 emissions. It will be necessary therefore to employ biofuel electricity with CCS (BECCS). The UQEI report makes clear the scale of the CCS challenge that would confront NSW:

> *NSW would require between 40 and 120 Mt of CO_2 capture and storage each year to achieve net zero emissions, based on its 2014 emissions profile. The global status of CCS puts the scale of this challenge into perspective. In 2016, there were 38 large-scale CCS projects globally with a combined CO2 capture capacity of approximately 70 Mtpa. Some 21 projects totaling 40.3 Mtpa were in operation or construction, 6 projects totalling 8.4 Mtpa were in advanced planning and 11 projects totalling 21.1 Mtpa were in earlier stages of planning.*
>
> *Therefore, to achieve net zero emissions without emission trading, NSW would need to become the world leader in carbon capture and storage projects, as well as the world leader in zero emission electricity generation and transport electrification. (p25)*

An alternative to pursuing negative emission strategies in NSW would be offsetting NSW emissions by reducing emissions in other countries. This might be possible through a system of international permits. There are, however, significant unknowns associated with a system of international carbon offsets.

The alternative to pursuing high cost negative emission strategies is that energy intensive industries may likely close in NSW. The resulting impacts on employment, government revenue and overall state GDP would be significant. Given the cost of some negative emission strategies it is likely that some level of industry closure will occur.

3.1.2 NSW Opposition

The NSW Labor Party's position of aligning with Federal Labor's 50% renewable energy target by 2030 is extremely concerning. The Federal Renewable Energy Target played a role in the current system volatility, bringing forward the closure of existing reliable, affordable and dispatchable generation as it forced new generation capacity into the system. It is concerning that despite this previous experience, even more ambitious targets are being proposed. NSW will also be affected by the renewable energy targets in our neighbouring states of Queensland and Victoria.

Renewable energy has been forced into the NEM by mandates under which subsidies and cross-subsidies are paid largely by electricity consumers and received by developers of large-scale renewable energy power stations (mainly wind farms), and participating households and customers with small-scale renewable installations (rooftop solar PV). The direct subsidies and cross-subsidies have been calculated as $2.95 billion in 2015-16.[16]

That estimate does not include implicit subsidies throughout networks and at the system-level. The figure does not take account of the wholesale price-depressing effect of surplus (renewable) generation capacity up to about 2015, nor of the wholesale price-escalating effect due to increasingly frequent periods of generation capacity scarcity since then. To put the approximately $3 billion annual national renewable energy subsidy figure into perspective, the total annual revenue across the NEM in FY2015-16 was $11.4 billion, up from $8 billion in 2014-15 rising to over $17 billion in FY2016-17.

In NSW, the wholesale electricity price pool has grown from $2.5 billion in FY2014-15 to $3.8 billion in 2015-16 and $6.2 billion in 2016-17. As is the case across the NEM, the annual energy generation has barely changed at about 70 000 GWh, not much higher than the 1999-2000 figure.

[16] Sabine Schnittger and Brian S. Fisher, *Primer on renewable energy subsidies in Australia*, BAEconomics, Canberra, January 2017, http://www.baeconomics.com.au/wp-content/uploads/2017/02/MCA-renewables-subsidies-8Jan2017-2.pdf

NSW's pro-rata share of LRET and SRES renewable energy subsidies in 2015-16, plus $202 million under NSW's feed-in tariff scheme was $988 million, equivalent to 26% on top of the value of wholesale electricity in NSW, as marked to National Electricity Market prices.

Despite all this intervention in favour of renewables, the actual level renewable energy penetration and capacity continues at low levels, albeit increasing. Labor's objective of a 50% renewable energy target by 2030 would require further ongoing significant policy and market intervention in favour of renewable energy. While generation and storage technology is improving, serious concerns have been expressed about the impact of further renewable energy penetration on grid stability and energy prices for large sections of the economy, including heavy industrial users. It is also concerning that NSW Labor is yet to outline a detailed pathway for achieving a 50% renewable energy target in NSW in just over a decade without significant economic and social dislocation for large sections of NSW, including key economic drivers like manufacturing and mining.

3.2 Recommendations for NSW policy

Mining and minerals processing operations are large consumers of electricity in NSW and are feeling the impacts of steep increases in electricity prices. As the ACCC has stated, *"there is a severe electricity affordability problem across the NEM and the price increases over the past ten years are putting Australian businesses and consumers under unacceptable pressure."*[17] If prices are sustained at current levels, or increase further, there are potentially large ramifications for businesses across NSW and the people they employ.

3.2.1 Develop a NSW energy strategy

The NSW Minerals Council supports the NSW Energy Security Taskforce's recommendation for an electricity strategy for NSW to be developed:[18]

> *That the Government develop an electricity strategy for NSW that identifies objectives for an ideal electricity system in NSW and can inform trade-offs, decision-making, regulatory arrangements, and program design in NSW.*
>
> *The strategy should also inform the NSW Government approach to negotiations at COAG Energy Council, including to promote the review and effective operation of the Australian Energy Market Agreement.*

While the NSW Government should continue advocating for a national approach to energy policy, it is essential that at the same time the NSW Government understands the effect that both national policy and the energy policies in neighbouring states will have on NSW, so that it is in a position to act on any risks to the security, reliability and affordability of the electricity system in NSW should the need arise.

Other measures that should be pursued in NSW include:

- **Continuing support for low emissions coal research and development** – The ongoing funding of NSW Coal Innovation is essential to further develop low emission coal technologies. The successful deployment of high efficiency, low emission (HELE) coal fired power generation, together with carbon capture and storage, are critical elements in the least-cost pathway towards deep cuts in emissions from the electricity sector.

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[17] ACCC Retail Electricity Pricing Inquiry Preliminary Report, September 2017, https://www.accc.gov.au/system/files/Retail%20Electricity%20Inquiry%20-%20Preliminary%20report%20-%2013%20November%202017.pdf

[18] NSW Energy Security Taskforce, Final Report, http://www.chiefscientist.nsw.gov.au/__data/assets/pdf_file/0019/136711/171219-MASTER-NSW-Energy-Security-Taskforce-report-FINAL-SIGNED.pdf

- **Remove planning obstacles for onsite generation at mines** – NSWMC recently convened a roundtable discussion for member companies on the potential for alternative energy supplies to manage rising energy costs.

  A key issue that arose during the discussions was the complexities with the planning system that act as a roadblock to pursuing alternative energy supply options on buffer land at mine sites. Often this land is the subject of existing development consents and mining leases, and the processes to modify these existing approvals are too complicated, time consuming, costly and open to risk for it to warrant being pursued.

  Policies to streamline this type of investment should be investigated.