Submission No 174

SUSTAINABILITY OF ENERGY SUPPLY AND RESOURCES IN NSW

Organisation: Delta Electricity

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Mr Alex Greenwich (IND, LA Member)
Chair
Committee on Environment and Planning Inquiry into Sustainability of Energy Supply and Resources

15 September 2019

Inquiry into Sustainability of Energy Supply and Resources

Delta Electricity appreciates the opportunity to contribute to the Committee on Environment and Planning's inquiry into the sustainability of energy supply and resources in NSW. Delta has been operating in the National Electricity Market since its start in 1998 and is well acquainted with the challenges associated with developing new utility-scale generation and the need for sustainable resources that support the production of affordable electricity for NSW businesses and households.

Delta holds a unique position in the NSW electricity market as the only major merchant generator that competes with the large integrated generator/retailer businesses. Delta also holds a retail licence to allow direct supply to a small number of large customers across the NEM, which helps Delta understand the pressures facing this segment of the market. Delta is diversifying its generation with a major solar generation offtake to commence early in 2020.

Delta developed the 670MW Colongra gas peaking power station in NSW, the Condong and Broadwater co-generation plants and currently has solar generation, pumped hydro energy storage and battery storage projects under development. Delta was also instrumental in developing the Cobbora coal resource near Mudgee.

Attachment 1 provides a detailed assessment on each of the topics listed in the Inquiry's terms of reference. The main points from Delta's assessment are summarised below.

1) Energy affordability should be the primary focus of policy makers:
   (i) according to the Australian Energy Regulator[1] there is increasing household energy debt and disconnection. Businesses are also reporting [2] the high cost of energy is driving operations and investment overseas;
   (ii) a sole focus on shifting generation from conventional thermal plant to renewables ignores the high total system cost of new renewable capacity (firming energy, system services and network upgrades) that will further push up electricity prices as low-cost dispatchable generation is forced from the market; and
   (iii) direct subsidies to small and large-scale renewables should be removed to allow cost competitive, technology neutral, investment in new generating capacity.

[1] https://www.aer.gov.au/news-release/hardship-protections-a-right-not-a-privilege-aer
[2] https://www.abc.net.au/news/2017-02-20/bluescope-steel-profit-jumps-nearly-80pc/8285628

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2) Renewable energy is not low cost and a technology neutral approach in energy policy will deliver better outcomes for consumers:
   (i) analysis by ARENA[3] identifies 24 hour dispatchable solar/hydro storage and 48 hour dispatchable wind/hydro storage costing over $140/MWh;
   (ii) according to AEMO's 2018 Integrated System Plan, the operating cost of dispatchable coal fired plant in NSW averages $42/MWh. This cost is well below new dispatchable renewables and NSW should look to extend the lives of the 660MW fleet for system security and cost benefits;
   (iii) the electrification of other sectors should be supported, particularly transport and agriculture. Electrification on the back of increasing variable renewable energy will assist in relieving solar farm curtailment at times of low demand and support the sustainability of conventional power plant power which provide low cost and critical power system support; and
   (iv) Australia's 2030 Paris commitment will be met in the electricity sector, which means NSW will meet its share for the sector. Targeting higher carbon abatement will increase electricity prices and potentially reduce the security of electricity supplies.

3) Coal fired plant supports power system reliability, security and affordable power and their critical role needs to be acknowledged in energy policy, particularly as alternatives to meeting the technical operating requirements of the power system are not currently financially viable:
   (i) according to the AEMO report "Observations: Operational and market challenges to reliability and security in the NEM" the high proportion of non-synchronous generation in South Australia means AEMO is often intervening to maintain a balance between synchronous and non-synchronous generation. With increasing non-synchronous wind and solar capacity in NSW the role of coal and gas fired plant in NSW to maintain system security will only become more important; and
   (ii) new market mechanisms, such as for operating reserves provided by 24/7 dispatchable plant, may need to be implemented quickly to support power system reliability as wind and solar generation continues to be built.

4) Through the COAG Energy Council and national policy processes, government should ensure regulated transmission investment must be subject to a rigorous economic assessment to minimise risk to consumers paying for stranded or underutilised assets for decades:
   (i) the regulated assessment of major transmission projects (Regulated Investment Test – Transmission) is based on market modelling which is subject to large forecasting errors. Even with the best modelling, consumers wear a risk of underperforming assets over decades that do not deliver benefits to justify the cost. Therefore, the RIT-T must be a rigorous economic test that always seeks to minimise the risk that consumers might have to pay for very long-lived assets that do not deliver net benefits over their full life;

[3] ARENA 2018 report - Comparison of dispatchable renewable electricity options. p. 65

(ii) the Energy Security Board has been charged with turning AEMO's Integrated System Plan into an actionable plan. The ESB is proposing to broaden the definition of transmission benefits beyond the pure economic so as to include AEMO's NEM obligations. This runs the real risk that 'strategic' type projects could be promulgated through the regulated process without due economic assessment and at a cost to consumers; and

(iii) as there is no material diversity in wind and solar generation across the NEM[4], increasing interconnection between the regions will not reduce the need for local dispatchable generation to cover periods of wind droughts and low solar generation. Interconnection capacity investment to allow renewable energy from one region to support system reliability in another is based a false premise that would result in a poor allocation of capital that will only result in higher costs to consumers.

5) Renewable subsidy schemes are distorting the market, undermining new investment, and can be closed:
   (i) in 2018, the level of subsidies given to wind and solar generation under the large and small-scale renewable energy target amounted to ~$2.8b, excluding the increasing cost of market interventions. A technologically neutral approach to new generation, and an end to subsidies, will provide a more certain investing environment that will support lowest cost new investment in utility scale generation when required;
   (ii) Snowy 2.0's storage capacity is not required in the NEM for the committed renewable build and it will crowd out smaller distributed storage options that would more effectively serve the market. This project will crowd out more efficient 'right-sized', better located and economic pumped hydro storage investment in NSW; and
   (iii) the Victorian VRET and Queensland QRET schemes will likely result in Australia's Paris target being exceeded. These schemes involve State Treasuries guaranteeing floor prices for intermittent wind and solar generation at a greater cost than coal-fired generation displaced[5], and exposes taxpayers to significant costs at times when all the solar/wind generation is occurring, and spot prices are low or negative.

6) NSW requires a fuel resource strategy to ensure the sustainability of NSW's coal fired generation and to keep downward pressure on electricity prices:
   (i) the departure of Government from this fuel security role has been an unrecognised factor in the generation "investment drought", and its effects remain observable most acutely in the Western region; and
   (ii) options to ensure NSW coal fired plant has access to affordable coal include:
      a. allocate resources to generators for domestic use only; or
      b. place an obligation on new resource owners to supply a prescribed volume of coal domestically, either in fixed tonnages or as a percentage of output; or

[4] Generator Report Card May 2019 Watt Clarity, p. 45 (Part 2)
[5] https://www.energycouncil.com.au/analysis/vic-renewables-reverse-auction-known-knowns-and-some-known-unknowns/

c. allocate resources to miners based on the lowest priced supply to local generators.

7) Coal fired power stations provide a large range of high quality jobs for local communities and operate within strict environmental licence conditions that protect public health and local ecosystems:
   (i) Vales Point and Chain Valley Colliery directly employ around 440 people and support the community through various sponsorship and donation programs;
   (ii) gas and coal fired power stations must operate within their environmental protection licence that prescribes strict operational standards and emissions limits;
   (iii) thermal power stations in NSW are subject to an environmental licensing scheme (Load Based Licensing) that provides ongoing incentives to improve environmental outcomes beyond those required by regulation or license;
   (iv) Vales Point and many other power stations have accredited environmental management systems that are subject to annual surveillance audits; and
   (v) reports from some environmental groups present an inaccurate view of the health impacts of coal fired power station impacts and only serve to unnecessarily scare local communities. A comprehensive review of a report on the health impacts of fine particulates can be found of the Australian Energy Council website.[6]

Investing in new generation and the challenges facing the National Electricity Market from increasing renewable energy are explained in Attachment 2. Additional detail on the critical role of role of coal fired generators in supporting greenhouse gas emission reductions is covered in Attachment 3, together with recommendations for the implementation of new system support services, such as spinning reserve.

[redacted]

Anthony Callan
Executive Director Marketing

[6] https://www.energycouncil.com.au/media/16734/enrisks-report-final.pdf

Attachment 1 – Inquiry Topics

Capacity and Economic Opportunities of Renewable Energy

Energy affordability should be the primary focus of policy makers

With Australia's Paris Agreement carbon emission abatement target expected to be met in the electricity sector with already committed large-scale renewable capacity, there is no longer a case for an expansion of the Renewable Energy Target (RET) or further support from the Australian Renewable Energy Agency or the Clean Energy Finance Corporation. The Victoria and Queensland State based renewable support schemes that put taxpayer funds at risk will only serve to increase volatility in wholesale prices through the cost of market interventions or from the early closure of low-cost baseload plant. The costs to consumers are considerable. In 2018, the level of subsidies given to wind and solar generation under the large- and small-scale renewable energy target amounted to ~$2.8b, excluding the increasing cost of market interventions. A technologically neutral approach to new generation, and an end to subsidies, will provide a more certain investing environment that will support lowest cost new investment in utility scale generation when required. Accordingly, there is no case for NSW to follow the other states by directing taxpayer funds to support more renewable generation.

New dispatchable generation, that would otherwise have replaced Hazelwood and Northern baseload power stations in VIC and SA, has not been built due to uncertainty over future energy policy and a reluctance by energy retailers and large industrial customers to commit to long term power purchase agreements. This situation was identified by the ACCC in its 2018 inquiry into retail prices, which resulted in its recommendation for Government to support bankable new investment in generation capacity to drive competition. For new generation capacity required in NSW post 2025, there could be case for some level of Government underwiring (not subsidy) to address what the ACCC described as market failure. Such underwriting should only be focused on overcoming financing hurdles that would otherwise not exist in a properly functioning market and not place undue risk on taxpayers. Caution is required when considering underwriting large projects that have the potential to displace other more efficient investment or result in electricity price increases to consumers from network upgrades and network support. A case in point is Snowy 2.0, which requires up to $2b of transmission infrastructure to be built. Snowy 2.0's storage capacity is not required in the NEM for the committed renewable build and it will crowd out smaller distributed storage options that would more effectively serve the market.

NSW's requirement for new generation capacity will most likely arise when existing power stations retire. According to AEMO[7], there is no shortfall in dispatchable capacity post the closure of Liddell power station. This assumes that other coal fired plant, like Vales Point, is not forced into early closure as a result of the impact of grid scale wind and solar farms, or from the new 750MW SA-NSW interconnector which will expose NSW to the impact of SA's overbuilt wind and

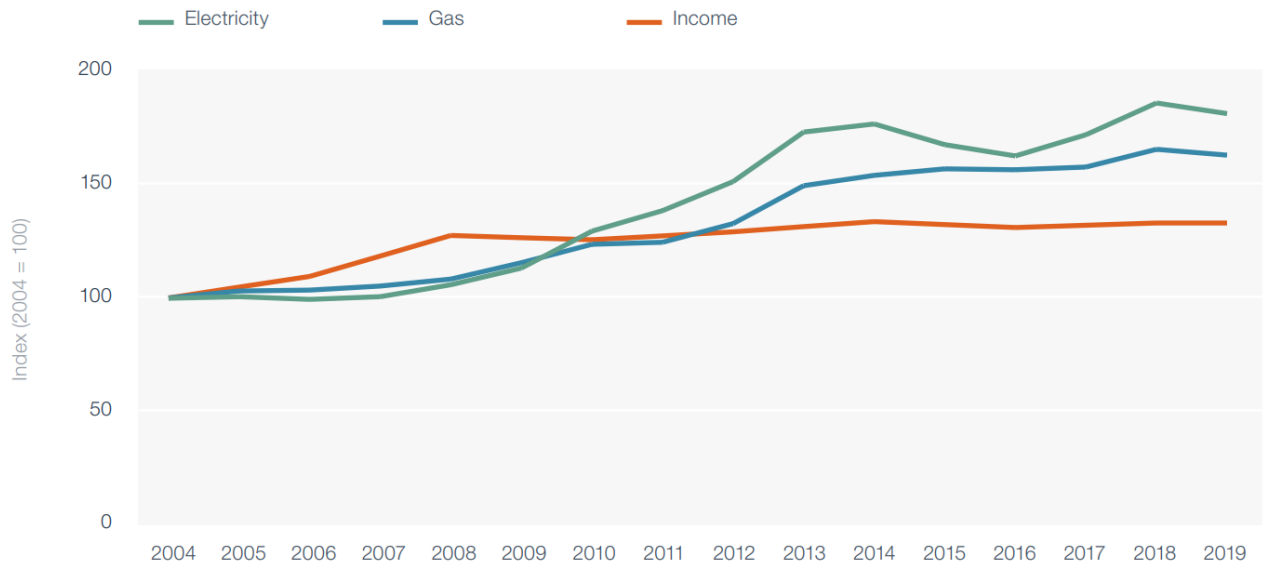
[7] AEMO 2019 Electricity Statement of Opportunities

solar variable generation. A life extension of Vales Point power station in 2029 would address AEMO's reserve shortfall past 2030.

Household energy debt and disconnections are increasing

The affordability of electricity, as shown in Figure A1-1[8], is deteriorating due to a substantial increase in electricity prices over the last ten years at a time when incomes have been flat in real terms. High electricity prices are adversely affecting households and according to the Australian Energy Regulator's annual report on compliance and performance of the retail energy market 2017-18, there has been a significant increase in the amount of average electricity debt residential customers are accruing[9].

Figure A1-1 – Household energy prices and income (real$)



Source: Electricity and gas index – Australian Bureau of Statistics (ABS)

The large jump in electricity prices occurred in 2016 and 2017 due to the closure of Northern and Hazelwood power station. Future closures of coal fired power plant will only serve to push electricity prices unless there is sufficient replacement generation capacity that is low cost generation on a 'total system cost' (delivered) basis. Stand-alone wind and solar is cost competitive, but not when the cost of firming, network and system services are included.

Increasing energy cost is driving business and investment offshore

BlueScope Chief Executive, Mark Vassella, has labelled Australia's high energy costs "a tragedy" for local manufacturing as the steelmaker announced a $1 billion expansion in the United States.

[8] Affordability in the retail energy markets report. AEMC September 2019
[9] Annual report on compliance and performance of the retail energy market 2017-18

Manufacturing Australia Chief Executive, Ben Eade, has stated "High energy costs are the biggest risk to manufacturing in Australia," and "Our challenge is avoiding demand destruction and loss of key plants." In a similar vein, Lindsay Partridge, Managing Director of ASX-listed Brickworks has stated that electricity prices in the US were about half of those in Victoria and gas prices were even cheaper, at about 25 per cent of the price paid locally. Brickworks is orientating its business to the US in an attempt to offset rising power prices in Australia and questions about the reliability of future supply as the shift to renewables gathered pace. Catherine Tanna, Reserve Bank of Australia Director and Managing Director of EnergyAustralia, has publicly expressed concern that the Victorian renewable energy the policy will force the closure of the 1480-megawatt Yallourn station, the country's most carbon-intensive power station, and could repeat an electricity price shock triggered by the closure of the Hazelwood power station in 2017

If Australia's trading partners and manufacturing competitors do not take the same action to reduce carbon emissions, then all that Australia will ultimately achieve is a weaker economy and less jobs, but no worldwide reduction in emissions. Worse still is if Australia decides to "lead" the world with carbon emission reduction targets and collectively the big emitting countries fail to act. In this scenario, Australia bears the cost of abatement but still experiences the cost of climate change. It is imperative that the sustainability of energy and resources be considered in the context of Australia's percentage of global emissions, its international commitments and its relationships with trading partners. To do otherwise risks damage to Australia's economic prosperity.

Regulated transmission investment must be subject to a rigorous economic assessment

The efficient operation of the electricity market requires investment in transmission network upgrades that deliver net economic benefits over the life the assets under a broad range of scenarios. Poor investment decisions for very long-lived assets could leave consumers paying for transmission upgrades for decades with little or no benefit. It is for this reason that the existing Regulatory Investment Test – Transmission (RIT-T) should be maintained in its current form and not compromised by transferring the first steps in the RIT-T to AEMO's Integrated System Plant that will allow a broader definition of benefits beyond the strictly economic. An example of this is the proposed transmission upgrades to facilitate new renewable generation in Renewable Energy Zones (REZs). Generators do not have firm access to the market node but do not have to pay for transmission use of system charges, except for connection assets. Building out transmission constraints to REZs is an inequitable market distortion that favours one technology type over another. In effect, this type of transmission build presents a barrier to entry for other technology types, that need to locate away from existing transmission, because of the cost advantage given to wind and solar.

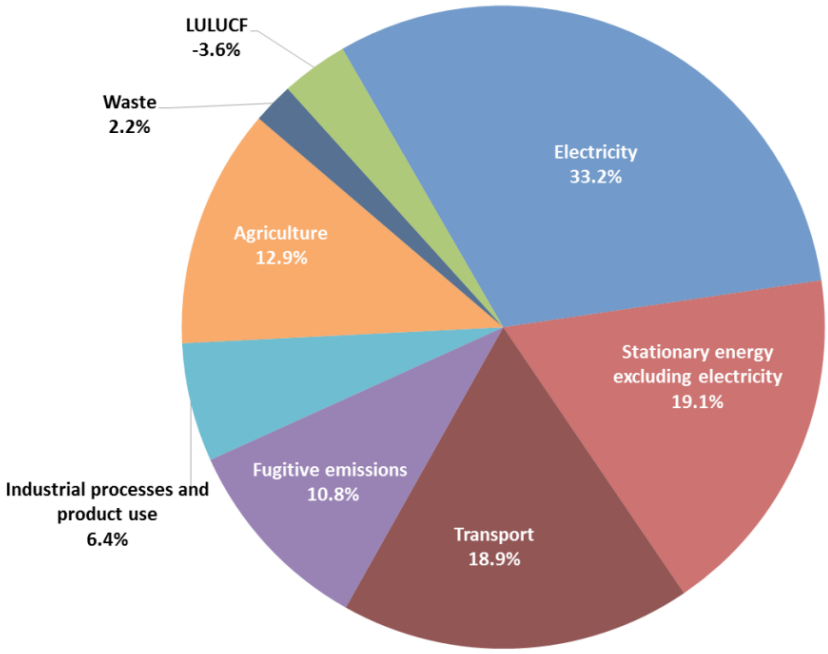
It is important to understand that transmission investment competes with generation investment, particularly when an interconnector upgrade is being assessed. It may be lower cost and better for system security to facilitate local generation over a reliance on energy being supplied remotely across an interconnector. One argument for upgrading interconnection is to take advantage of the diversity of wind and solar resources across the NEM. The premise being that when all intermittent sources are combined, there may be some 'firm' component of generation that could support power system reliability. However, analysis of wind and solar generation does not support this view. Market data assessment by WattClarity on wind speed correlation between

renewable energy zones across the NEM showed no, or positive, correlation. This data suggests that interconnection capacity investment to allow renewable energy from one region to support system reliability in another would result in a poor allocation of capital and higher costs to consumers.

Carbon emission reduction in other sectors needs to be supported

With the electricity sector on track to meet its share of Australia's 2030 emission abatement obligation, focus on other sectors is required to meet Australia's economy wide commitment. Figure A1-2 shows carbon emissions by sector.

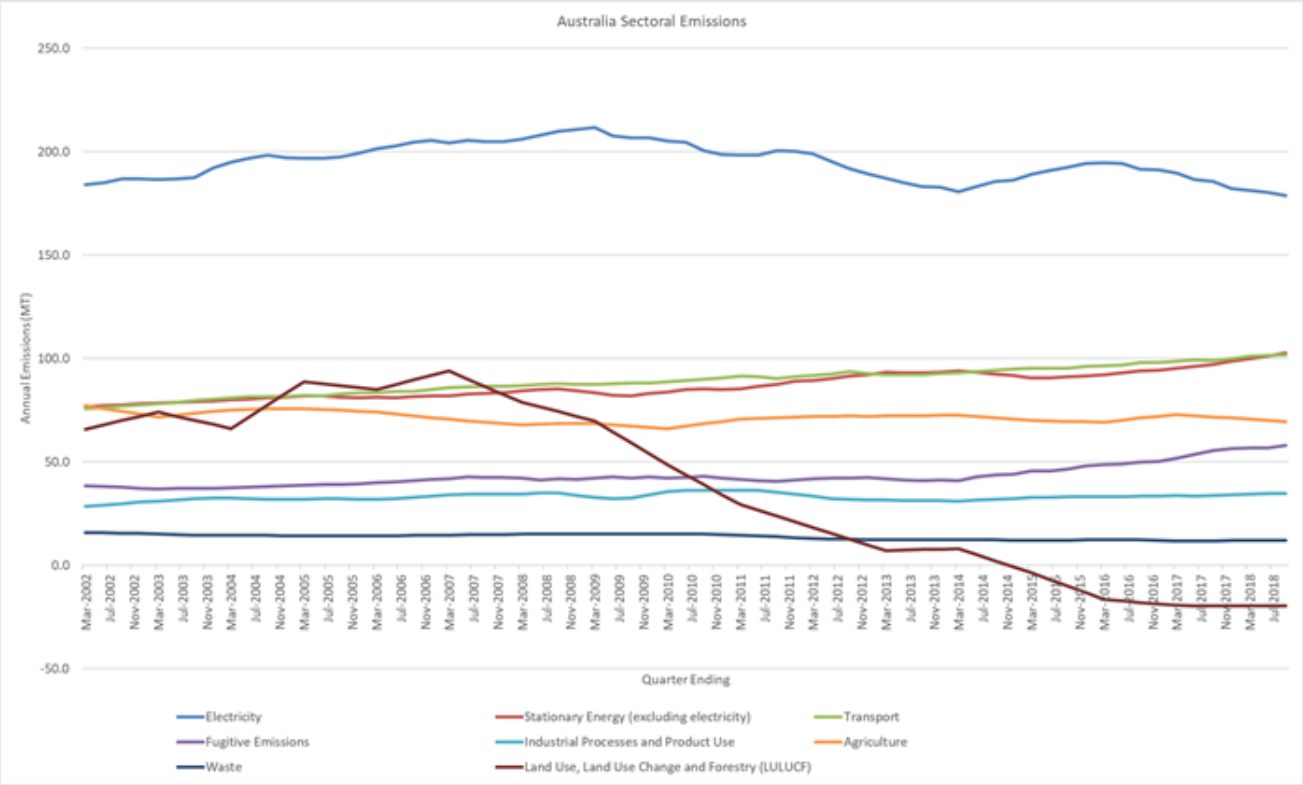
Figure A1-2 – Carbon emissions by sector 2017



Source: Department of the Environment and Energy

Figure A1-3 shows how electricity sector carbon emissions has been trending down, whilst other sectors have been tending up. This highlights the need to direct the focus of initiatives to the non-energy sectors.

Figure A1-3 – Carbon emissions sectoral trends (Dept of Energy and Environment)



McKinsey and Co has stated that up to 60% of energy used in transport, buildings and industry could be converted to electricity by 2050, as shown in Attachment 4. Electrification of energy use in transport, buildings and industry will increase electricity demand during the day, and deliver the following benefits:

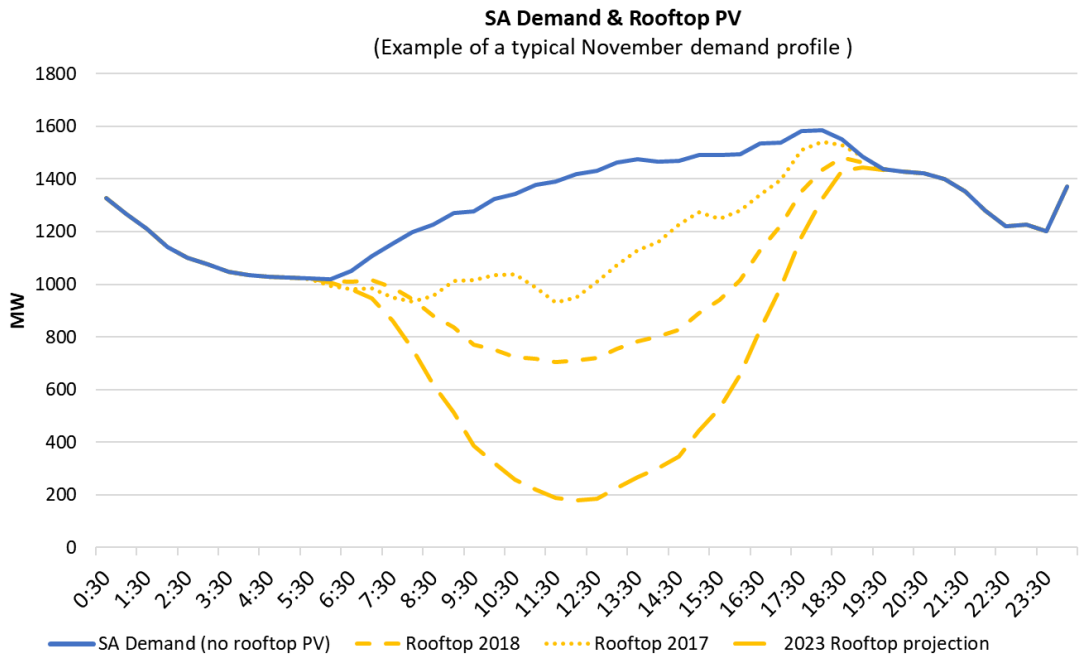
(i) utilisation of dispatchable generation capacity that is being displaced at times of high wind and solar energy. This under-utilised generation capacity will be available as the market transitions to lower carbon emissions and until other technologies can economically replace conventional power plant;

(ii) improve system reliability through reduced stress on baseload plant that is increasingly having to change dispatch in response to large variations in wind and solar output. Some coal fired generators are contemplating having to take units out of service for short periods during the day (high wind and solar periods), which carries the risks that these units will not always reliably return to service to meet late afternoon or evening peak demand; and

(iii) address the system security implications of very low system demand as utility-scale and rooftop PV generation increases. Issues include difficulty in managing power system voltage and market intervention to curtail VRE generation.

AEMO predicts that by 2023 the rooftop solar PV could be close to suppling all of SA demand, bringing the NEM wholesale demand to only 200MW as shown on Figure A1-4.

Figure A1-4 – SA system demand changes with increasing rooftop solar PV



The hollowing out of demand during the day is now being seen in NSW, though to a much lesser extent than SA at this time, but interconnection of NSW to SA will accelerate this problem. As this trend continues, dispatchable plant will initially be occasionally forced to operate inefficiently on minimum load (higher carbon emission rates) and at some time in the future generating units may need to be taken out of service to avoid operating at very low or negative prices. Highly flexible gas peaking plant should ensure demand is met, but at a substantially higher cost than coal. Based on the 2023 projection, only 200MW of dispatchable generation capacity is required around midday, but by 6pm the requirement is over 1400MW.

Electrification strategies the NSW Government could consider are outlined below:

a) Electric vehicle (EV) support

The primary barriers to development of a sustainable EV industry is the cost of EVs and a convenient charging network. As noted in the 2018 Electric Vehicle Council report "New Policy Proposal: Recharging the economy Accelerating electric vehicle adoption", Government signals (such as setting fleet targets) can provide the certainty required to deliver a greater variety of electric vehicle models to Australia and support ongoing

investment in charging infrastructure and associated services. A NSW Government initiative to support the industry without long term subsidies could include:

(i) adopting an achievable 2025 and 2030 NSW Government fleet quota;
(ii) funding an initial charging network in some parts of Sydney to help underpin a critical mass of customers such that industry would have the confidence to invest in a larger network; and
(iii) supporting electricity retailers to equip households with the necessary supply capability for EV charging.

b) *Stationary energy conversion to electricity*

Stationary energy includes direct combustion of fuels like gas and diesel in building/home heating, manufacturing, mining and commercial sectors. There is a genuine opportunity for NSW to be at the forefront of a broader trend that will work in the interest of consumers, as opposed to other states' energy schemes that cost consumers and diminish system security. Government policy to help businesses change from gas/diesel combustion to electricity use would also ease gas prices for industry where electrification is uneconomic.

Simple examples of opportunities include:

(i) re-prosecute off-peak hot water programs to use lower priced electricity in the middle of the day; and
(ii) in the agriculture sector change diesel pumps to electric pumps that can be automated to operate during low priced electricity periods.

Emerging Trends in Energy Supply

Renewable energy is not low cost

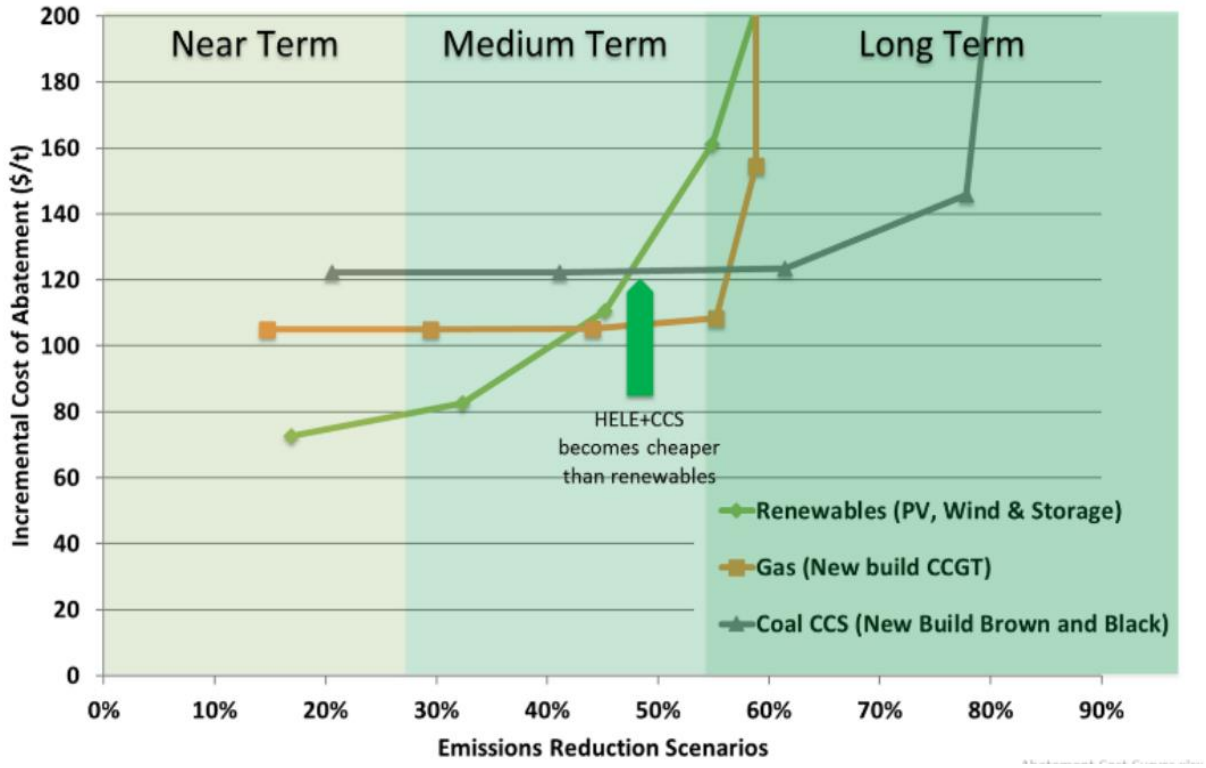
The sustainability of energy supply must not only consider Australia's greenhouse gas reduction commitment, but also the reliability and affordability of energy. There is a misconception that renewable energy is the lowest cost new build supply. A large-scale wind or solar farm in a high resource location can deliver a unit of energy at a lower cost a new thermal or nuclear plant. However, there are other costs associated with delivering a reliable supply to a consumer, such as complementary 24/7 dispatchable energy supply, network upgrades and power system security services. As published by ARENA[10], 48 hour dispatchable utility solar plus pumped hydro energy storage generation cost exceeds $140/MWh, not the $65/MWh standalone solar cost identified in the report. This high cost also excludes additional costs associated with network enhancements and system security services. The additional capacity of renewables is placing downward prices on market prices, but when the next thermal plant retires, prices will lift, and replacement system services will need to be sourced. One recent example of the cost of system strength services is the AER's decision to allow ElectraNet to

[10] 2018 ARENA Comparison of Dispatchable Renewable Electricity Options report.

recover $166m from customers for four new synchronous condenser units, which will only partial resolve problems in the State.

ANLEC R&D, an Australian national research initiative supporting Carbon Capture and Storage (CCS) deployment in Australia, has recently commissioned Gamma Energy Technology and RedVector to perform a highly detailed assessment of the total cost to supply renewable energy to consumers. This work is being performed in partnership with a range of representatives from the sector, including AEMO. The results of the current study will be available later this year. However, past studies have highlighted the increasing cost of carbon abatement as the percentage of renewable energy in a power system increases, as shown in figure A1-5[11].

Figure A1-5 – Cost of abatement pathways with increasing renewable energy



The implications of higher energy cost for the Australia's economy are significant.

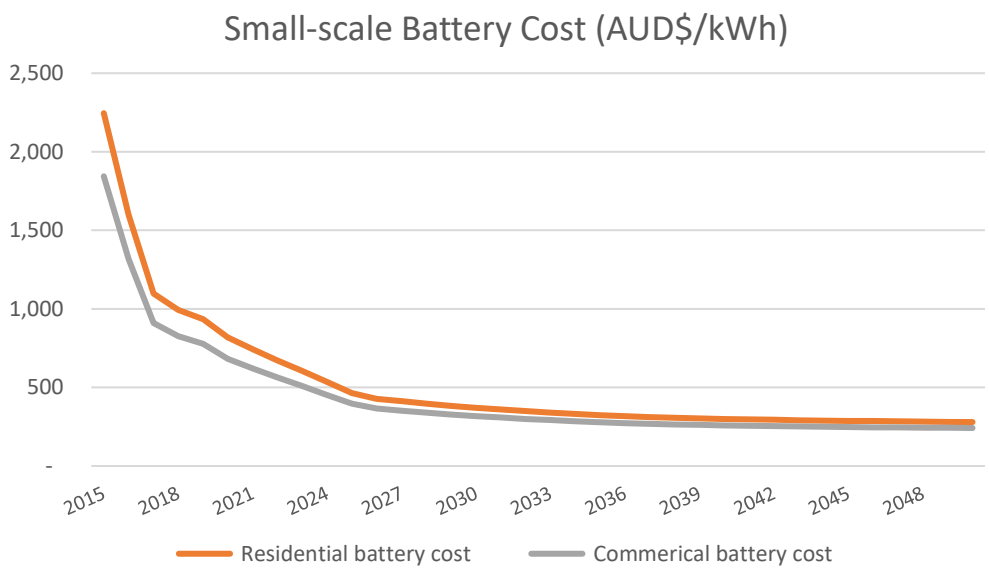
Battery technology cost are decreasing

Small-scale battery technology has seen dramatic cost reductions over recent years (Figure A1-6). Retailers and energy aggregators are well placed to provide cost effective options to

[11] Renewable and the NEM: What are the limits and what else is needed to go zero? 2017. https://anlecrd.com.au/capture-reports/

maximise the value of small-scale battery technology to households that achieve lower electricity costs over the life of the investment. Direct subsidies of small batteries are not needed. Moreover, this would only serve to distort market signals for cost effective storage technology or dispatchable new generation at the wholesale level.

Figure A1-6 – Bloomberg New Energy Finance projection of battery costs (estimates of actual cost to 2018)



The electricity market is no longer fit for purpose and needs to be fixed

The National Electricity Market has become dysfunctional in South Australia with its level of price volatility and requirement for frequent interventions by the market operator. It is anticipated that NSW will experience similar market outcomes as the balance of RET renewable capacity is commissioned and additional renewable energy flows into NSW when the interconnections to other states are upgraded. The Energy Security Board is undertaking a 2-year project to determine a 'fit-for-purpose' NEM design that will have implications for investment in NSW. Sensible and enduring market design reform should be supported to ensure that the market becomes the primary support for new generation, regardless of technology type. The right market design will also incentivise storage technologies like pumped hydro and large-scale batteries. AEMO is also undertaking an assessment of the ability of the NEM to accommodate variable renewable energy (VRE) like small- and large-scale wind and solar. It is possible that AEMO will recommend limitations on the amount of VRE that can be built without complementary system support services. Developers of new renewable generation should see the cost of these system support services to ensure investment decisions are least cost from a consumer's perspective. The ESB and AEMO studies should be integrated to ensure a consistent set of recommendation are delivered.

The existing coal fired power stations in NSW will continue to play a critical role in supporting power system reliability and security, and in delivering affordable electricity over the coming decade. The marginal cost of NSW coal-fired plant is typically below $40/MWh, which is below stand-alone wind and solar generation cost and well below wind and solar firmed by storage[12]. Forced early retirement of coal-fired plant, as witnessed with Northern and Hazelwood power station closures, will only serve to unnecessarily increase wholesale prices. Even Snowy 2.0 with Federal Government support is reported[13] as expecting to sell its output at $100/MWh or more, and its operation will not bring down prices. The best option for NSW to contain electricity prices is to support the sustainable operation of conventional coal and gas plant as the NEM transitions to a lower carbon intensity. This support can include:

(i) advocating for new market mechanisms, such as for spinning reserve, as being investigated by ESB in its post 2025 review, that values coal and gas dispatchable plant for the provision of critical system services;
(ii) considering economic life extensions of coal plant as critical NSW infrastructure, where this plant is required for the reliable, sustainable and affordable supply of electricity; and
(iii) facilitating access to competitively priced primary energy sources, such as new coal developments being offered with affordable foundation contracts to existing power stations.

Energy and Resource Forecast

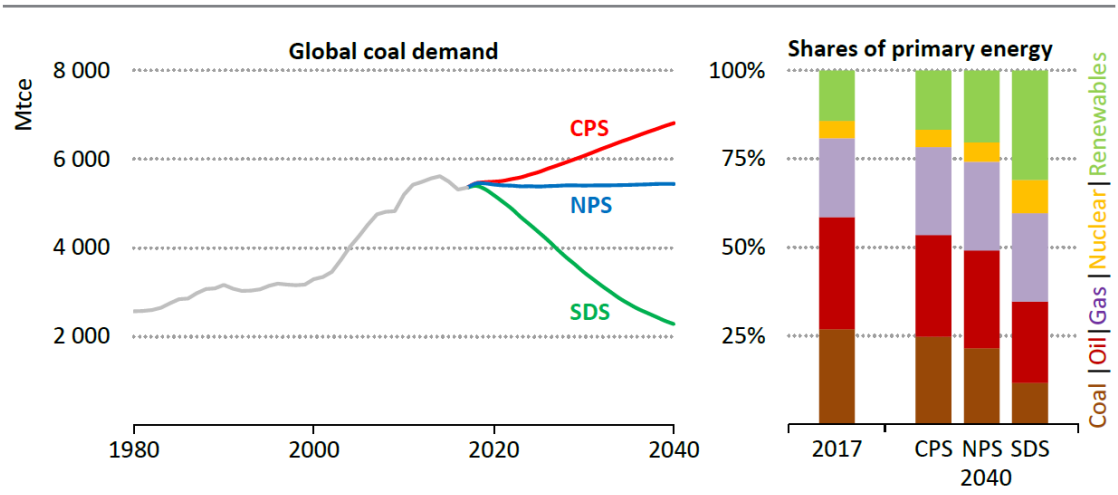
It is a misconception to believe that Australia's coal exports will decline over the next two decades and that Australia's primary coal mining regions will need to transition employment away from mining. Figure A1-7, show the International Energy Agency's (IEA) coal demand forecasts for three scenarios:

(i) Current Policies Scenarios (CPS) – existing climate related polices continue and energy use increases in developing countries;
(ii) New Policies Scenarios (NPS) – adopting new climate policies and continued improvement in energy efficiency; and
(iii) Sustainable Development Scenarios (SDS) - new policies settings with fast deployment of renewables and storage.

The NPS is still optimistic given that this scenario assumes a significant increase in carbon abatement measures in all countries. Therefore, at this time, the CPS is the most likely outcomes for carbon emission abatement.

[12] ARENA 2018 report - Comparison of dispatchable renewable electricity options. p. 65
[13] https://reneweconomy.com.au/modelling-suggests-snowy-2-0-will-lift-prices-defend-coal-kill-batteries-96600/

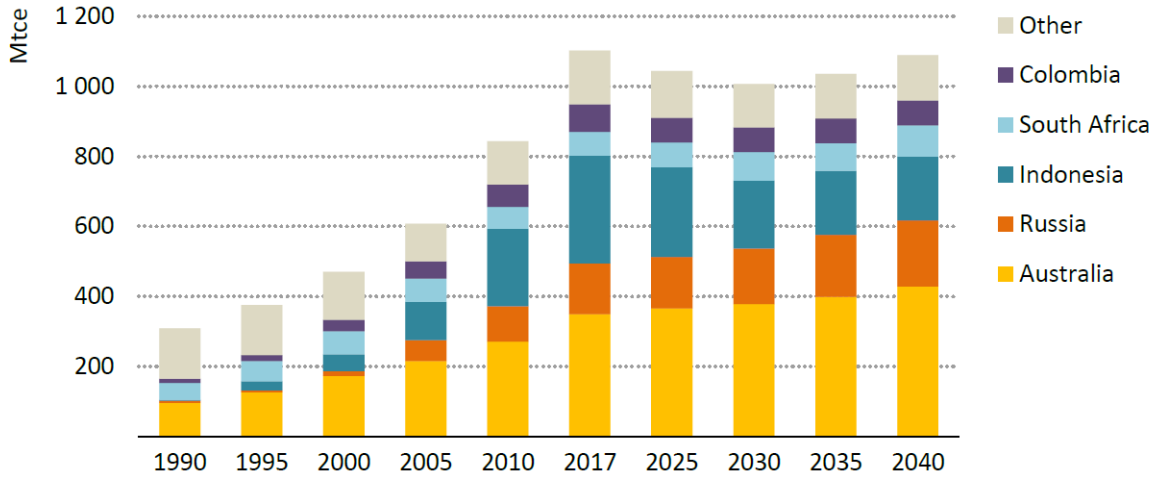
Figure A1-7 – IEA Global coal demand forecast (2018)



Source: International Energy Agency (IEA) 2018 World Energy Outlook.

Even under the optimistic New Policies Scenario, Figure A1-8 shows that Australia' is forecast to increase its coal exports.

Figure A1-8 – IEA Australian coal exports under the New Policies Scenario



Source: International Energy Agency (IEA) 2018 World Energy Outlook.

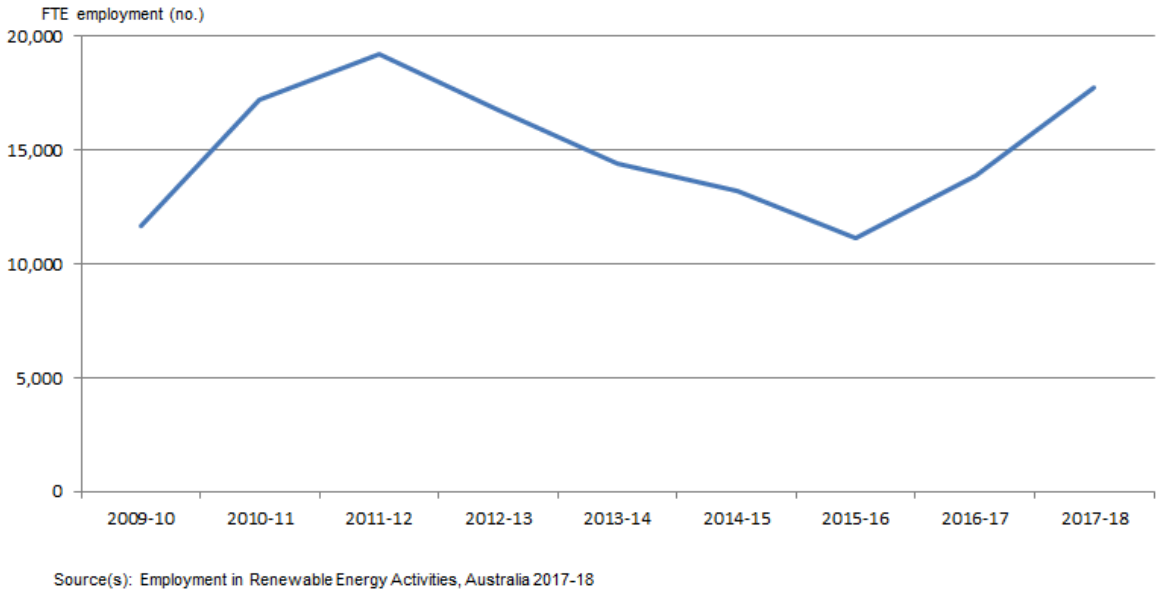
The expectation that renewable energy projects will deliver a jobs boom is simply not support by evidence. The Australia Institute [14] has asserted that 53% renewable energy capacity by 2030 would create between 18,000 and 59,000 direct jobs across the country. Notwithstanding this

[14] https://www.tai.org.au/content/renewable-energy-boom-60000-new-australian-jobs-2030

highly unrealistic renewable capacity target, it is hard to see any material job creation given that there is already an existing workforce involved in the current large renewable built.

According to the Australian Bureau of Statistics[15], annual direct FTE employment in renewable energy activities in Australia was estimated at 17,740 jobs in 2017-18. As Figure A1-9 shows, there was an increase of 3,890 jobs from the previous year. 1950 new FTE jobs were directly associated with large-scale solar construction. A jobs boom in the renewable sector is a myth.

Figure A1-9 – IEA Australian coal exports under the New Policies Scenario



Source(s): Employment in Renewable Energy Activities, Australia 2017-18

Regional Communities

NSW's large conventional power stations are large direct employers and local economy's see the benefit from the large range of services power stations contract with local businesses. Like most generation businesses Delta, through sponsorships and donations, invest in many community activities, programs, services and facilities, often in partnership with local Councils. Each year a community relations plan is prepared which identifies issues emerging in the local community and actions that will enhance the quality of life of those who live in the area. Delta also helps improve local parks for families and people with disabilities and supports Landcare and other environmental work and help many local organisations including Tidy Towns, the Country Women's Association, the Cancer Council, surf clubs, playgroups and local high schools.

Coal fired power stations operate within strict environmental licence conditions that protect public health and local ecosystems:

[15] https://www.abs.gov.au/ausstats/abs@.nsf/mf/4631.0

(i) gas and coal fired power stations must operate within their environmental protection licence that prescribes strict operational standards and emissions limits;
(ii) thermal power stations in NSW are subject to an environmental licensing scheme (Load Based Licensing) that provides ongoing incentives to improve environmental outcomes beyond those required by regulation or license; and
(iii) Vales Point and many other power stations have accredited environmental management systems that are subject to annual surveillance audits.

In the case of power stations like Vales Point the use of water resources is relatively small. Water used for cooling steam after it has passed through the turbines is drawn from Lake Macquarie then returned. Vales Point also has a water reclamation plant that uses treated sewage so it can be used in the demineralisation plant. This plant is saving up to 230 million litres of fresh water a year.

Vales Point's air emissions are also subject to strict licence conditions and air quality monitor shows that the impact of current power stations emissions on the Central Coast is insignificant.

Sustainable Economic Development

NSW consumes around 25Mt per annum of coal for electricity generation, at a cost of around one third of that for natural gas. Moving generation from coal to gas power plant to reduce carbon emissions is impractical given limitations on gas exploration and the comparative price of gas.

As noted above, coal fired power plays a critical role in maintaining affordable electricity prices. Figure A1-10 shows how increases in export coal prices are correlated to spot market prices. Export prices have softened in recent months is supporting lower electricity costs, but if coal prices rebound then there will upward pressure on electricity prices.

Figure A1-10 – Correlation between coal and electricity prices

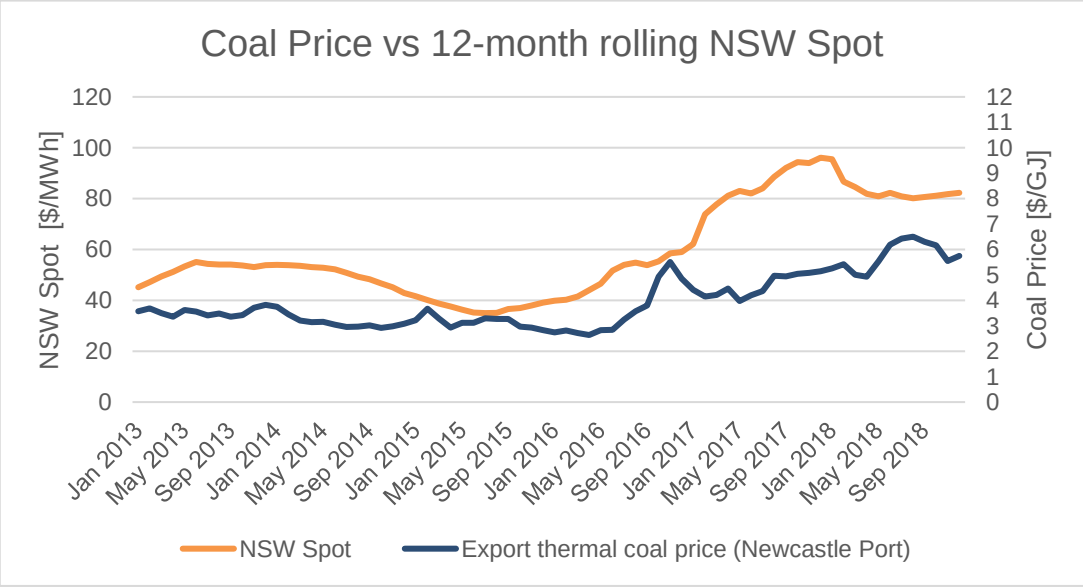


Figure data source: GlobalCOAL and AEMO

One way to disconnect export coal prices from NSW electricity prices would be to consider a resource allocation policy to underpin lower electricity prices. As an example:

1. new coal developments could be offered:
   (i) with foundation contract(s) to existing NSW generators for domestic use only;
   (ii) offered on the basis of lowest priced bids for domestic coal; or
   (iii) with an obligation to supply prescribed tonnages to NSW generators;

2. to generators in return for securing a new baseload generation investment:
   (i) new generation is at a cost disadvantage to existing generators;
   (ii) control allows coal production flexibility to match market requirements; and
   (iii) is a policy that is consistent with Victorian and Queensland resource allocation to coal fired generators.

Mines with pre-determined, foundation contracts with generators for a proportion of their output, should also assist with their funding given that generators have strong financial capability for credit assessments and pay in $AUD.

Attachment 2

ELECTRICITY GENERATION INVESTMENT IN NSW

Challenges facing the National Electricity Market from Increasing Renewable Energy

1. Variable Renewable Energy (VRE) penetration limits

There are limits to the amount of VRE (e.g. wind and solar) a power system can accommodate. In Ireland, for example, the wind/solar output is limited to 65% of instantaneous demand and this level can only be achieved with power system arrangements that limit and control the rate of change of frequency. Wind and solar generation cannot provide meaningful system support services, and a substantial amount of standby dispatchable generation is required to cater for the intermittency of wind and solar, particularly during extended periods of windless and non-sunny days. Ireland always maintains sufficient fully dispatchable generating capacity to cover peak demand and has the benefit of 1000MWs of interconnection to Scotland and Wales. At this time Ireland, as one of the leaders in VRE, has only just managed 30% energy from VRE and will not meet its EU 2020 carbon abatement target.

AEMO has commenced a technical assessment of the level of VRE the NEM can currently accommodate. This study may result in limits on new VRE. In addition, the Energy Security Board is undertaking a 2-year project to determine a 'fit-for-purpose' NEM design that will have implications for investment in NSW (i.e. a market design will change investment incentives). The AEMO and ESB studies must be fully integrated to ensure there are no conflicting recommendations and the combined work delivers a holistic and comprehensive solution to challenges presented to increasing VRE. Ireland put in place market design changes and system operational requirements in advance of VRE development. The result in Ireland is a market framework that only allows increases in VRE that can be accommodated by the power system without compromising system security or reliability.

To ensure a reliable and affordable supply of electricity in NSW, the NEM design needs to support the sustainable operation of base load fully dispatchable plant. Overseas islanded electricity supply systems have managed the introduction of wind and solar to greater extents in a rational manner, by moving from a straight "energy-only" market model of the NEM by introducing payments for essential 'operating' dispatchable generation reserves and introducing additional new electricity system support payments for frequency support and for standby dispatchable spinning reserve capability to counter the intermittency of wind and solar and to meet electricity demands when the sun goes down and the wind stops.

Given the urgency for market reform to deal with the existing issues of very low prices, an interim and immediate measure to pay for spinning reserve would support a reliable power system until a more holistic solution can be developed.

2. Overbuild of SA renewables and impact on market operations

VRE has been over-built in SA and VIC in advance of regulation and guidelines to manage system security. Figure A2-1[16] shows the increase in AEMO market interventions in SA as VRE has increased. The level of intervention suggests the market is no longer functioning effectively, with high and volatile spot market prices and no incentives for generators to provide system security services like inertia[17].

Figure A2-1 – AEMO SA Directions

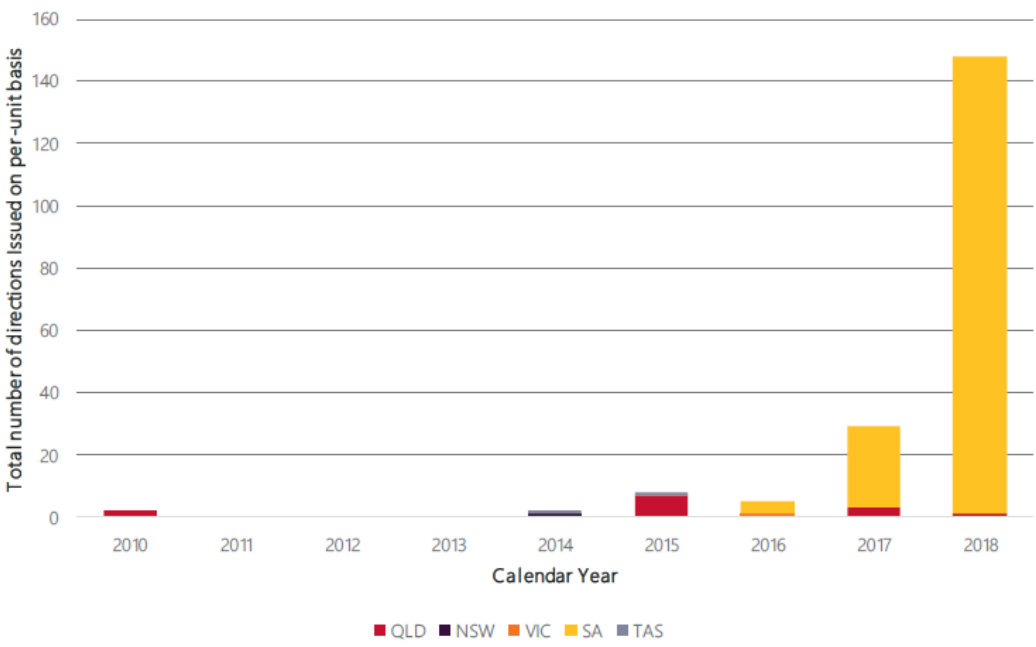


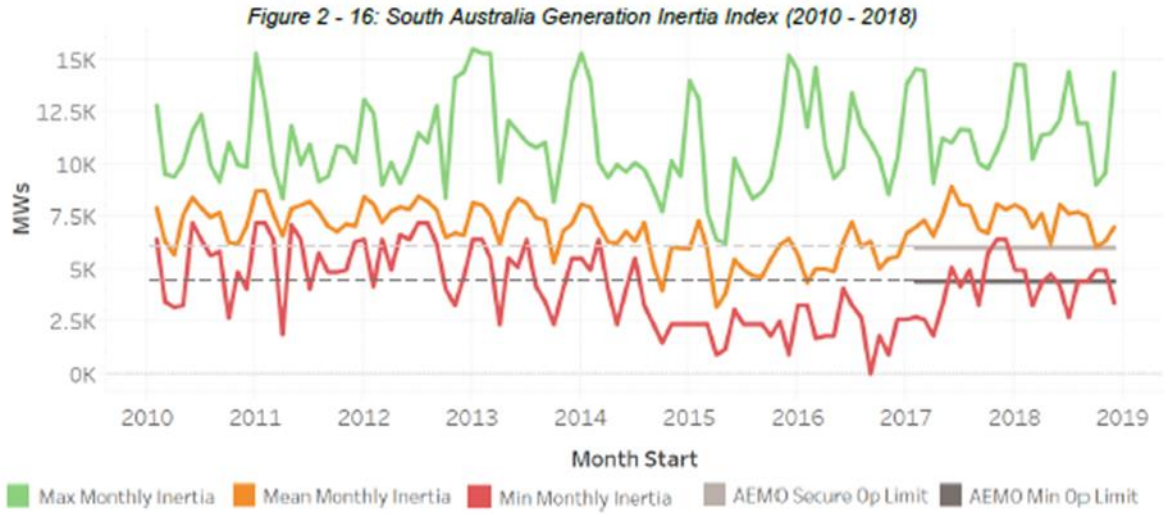
Figure A2-2, from WattClarity's May 2019's Generator Report Card, highlights that reducing inertia is not just a SA problem. Post the Hazelwood closure, there have been times when

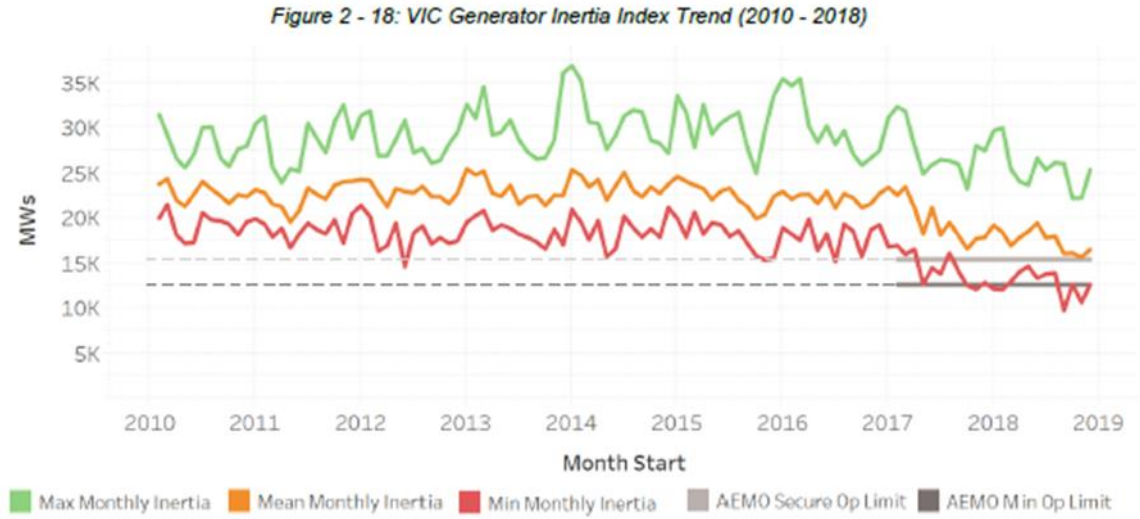
[16] https://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/SA_Advisory/2018/2018-South-Australian-Electricity-Report.pdf

[17] Inertia limits the rate of change of system frequency after the loss of generation or load. Conventional power plant like coal fired generators provide inertia as a characteristic of the spinning mass of their steam turbines and generator rotors

VIC inertia has dipped below the AEMO's guidance on minimum levels to ensure a secure power system in the event of a major system event.

Figure A2-2 SA and VIC inertia trends





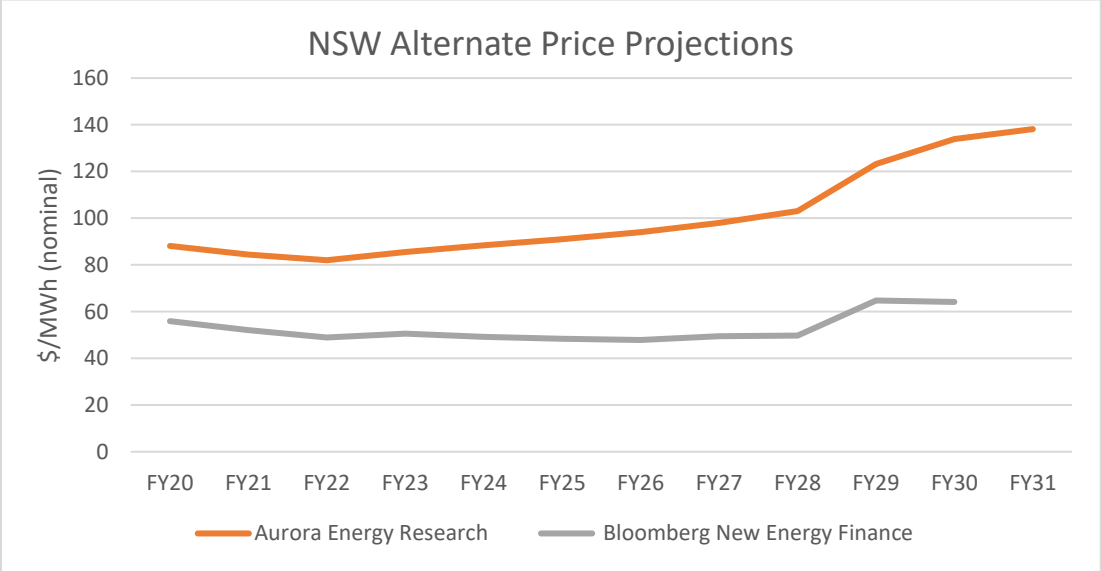
Most other interconnected electricity supply systems around the world have the added advantage of synchronous dispatchable nuclear and greater base-load hydro-generation, along with lower-priced gas and greater inter-country interconnections, to provide electricity system frequency and voltage support, as well as standby dispatchable generation to cover the intermittency of wind and solar.

Existing coal fired plant is the lowest cost source of 24/7 dispatchable electricity available in NSW, Queensland and Victoria, with short-run marginal unit fuel costs at around one third of

gas-fired generation cost in NSW. As VRE increases, coal and gas fired generation will be displaced and there will be times of the day when spot prices are very low or negative. As evidenced with the early closure of Northern power station in SA resulting from low market prices created by the high level of wind generation, the loss of low cost dispatchable plant caused a significant increase in prices and a reduction in system security. This occurred because high cost gas plant became the prominent price setter in the region and there is insufficient gas plant running at times of lower prices to deliver the required levels of inertia. Similarly, in Victoria, after Hazelwood closed, gas generation and shadow pricing hydro became a dominant price setter, causing average wholesale price to rise substantially.

Figure A2-3 shows a NSW market price projection from Aurora Energy Research that assumes early closure of coal fired plant as a result of a 50% renewable energy target, compared to Bloomberg New Energy Finance projection with no early coal fired plant closures. If coal fired plant can remain sustainable with lower levels of production, market prices are expected to be lower.

Figure A2-3 – Aurora Energy Research high VRE case (not for publication)



Conventional power plant provides the system frequency and voltage support services necessary to maintain a secure and reliable power system. Such conventional dispatchable generation plant is still required for the foreseeable future, particularly as more VRE is built, to maintain a secure, reliable and affordable electricity supply.

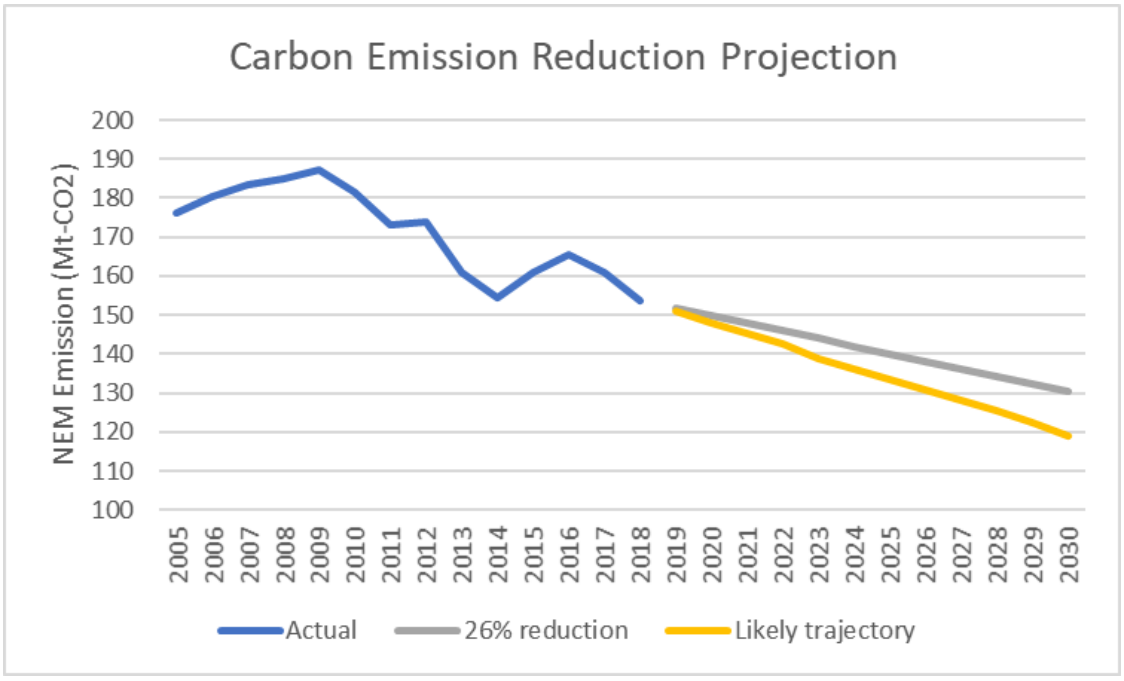
Options to support coal fired generation as the market transitions to lower carbon emissions could include providing access to system security service revenues that would otherwise go to transmission networks (e.g. new inertia services) and payments for reliability services such as spinning reserve that could be more cost effectively provided by existing plant rather than from investment in more expensive gas peaking plant or large scale energy storage.

The State Governments of South Australia and Victoria have overseen the closure of the Northern and Hazelwood power stations, both critical power generation assets, reducing the supply of electricity across these States and into NSW, with gas-fired generation competing to meet demand at the much higher marginal cost compared to displaced coal-fired generation. The experiences of SA and VIC serve as a warning to other State Governments of pursuing an aggressive renewable build without considering the consequences for affordance and reliable electricity supply.

Investing in Variable Renewable Energy Sources

According to the Clean Energy Regulator, since 2016 there has been over 6000MWs of wind and solar generating capacity accredited under the Renewable Energy Target, with a further 6500MW of committed and announced wind and solar farms to be operating by the end of 2020. This new renewable generation, combined with the expected closure of coal fired plant next decade, starting with Liddell in 2022, will deliver the Paris target of 26% reduction in carbon emissions since 2005 for the electricity sector. From a Federal energy policy perspective, Australia's international greenhouse gas abatement obligation will be met. As such, further support for renewable energy once the RET is satisfied in 2020 is not required. Based on the AEMO 2018 Integrated System Plan (ISP), coal plant retirements and the Clean Energy Regulator's assessment of committed and probable new renewable capacity, carbon emissions in the NEM will be over 30% lower in 2030 compared to 2005 (Figure A2-4).

Figure A2-4 – NEM CO2 reduction trajectory



The Victorian VRET and Queensland QRET schemes will likely result in the target being exceeded. These schemes involve State Treasuries guaranteeing floor prices for intermittent

wind and solar generation at a greater cost than coal-fired generation displaced[18], and exposes taxpayers to significant costs at times when all the solar/wind generation is occurring, and spot prices are low or negative. With the cost of wind and solar technology continuing to fall, this technology should now compete on a level playing field with other technologies to deliver new generation capacity when needed, at the lowest cost to consumers.

Private sector grid scale dispatchable generation investment

Investing in new electricity generation assets requires market conditions that clearly signal the requirement for new generating capacity and a business case that allows financiers to mitigate the risk of investing in a market known for its uncertain and volatile prices. Typically, this will be in the form of a long-term electricity offtake. With flat load growth, new generation capacity would normally only be required to replace retiring plant. However, the investment environment has been distorted by the large renewable energy build that has occurred as a direct result of Government support from the Renewable Energy Target (RET), the Australian Renewable Energy Agency, the Clean Energy Finance Corporation and various state-based schemes.

New dispatchable generation, that would otherwise have replaced Hazelwood and Northern baseload coal fired power stations, has not been built due uncertainty over future Federal energy policy and a reluctance by Retailers and large industrial customers to commit to long term power purchase agreements. This situation was identified by the ACCC in its 2018 inquiry into retail prices, which resulted in its recommendation for Government support to make bankable new investment in generation capacity to drive competition. Government underwriting at levels to support debt repayment is required to support project financing for large, long-lived capital-intensive new generation projects, given difficulties in obtaining long term offtakes to secure revenue.

New electricity market mechanisms (like long term capacity payment arrangements) should be supported as they are likely to be needed for financing new dispatchable generation capacity that is replacing retiring plant. Existing coal fired power stations should be appropriately compensated for the system services they provide. When new dispatchable generation is required in NSW, investment should be open to all technology types so as to ensure the lowest cost to consumers over the long term – this includes efficient coal fired generation capacity on brownfield sites that will already have transmission access.

Transmission development

New transmission is capital intensive, very long-lived infrastructure that could become stranded assets in a rapidly changing technology environment. Where transmission development is not fully utilised or stranded, electricity consumers would be paying for that asset over many decades for potentially no benefit. Transmission network owners face very little project risk under the

[18] https://www.energycouncil.com.au/analysis/vic-renewables-reverse-auction-known-knowns-and-some-known-unknowns/

current regulatory arrangements in that once a project is approved by the AER it becomes part of network owner regulated asset base.

The Energy Security Board (ESB) is currently consulting on converting AEMO's Integrated System Plan (ISP) into action. Of concern, the ESB appears to be promoting less economic rigorous guidelines for the assessment of major transmission upgrades for the ISP than applies to the AER's Regulatory Investment Test – Transmission (RIT-T). This approach risks major projects being promoted early in the assessment process and ultimately promulgated through subsequent reviews to an ultimate approval. In effect, the ISP becomes a centralised plan of the sort that failed consumers in the past and led to the 1990's reform program that introduced electricity markets. The risk of inefficient investment is exacerbated by AEMO's conservatism in relation to forecasting and planning. AEMO has historically indicated much higher demand growth than was actually seen. A conservative approach to planning will likely result in a projection of a greater need for new transmission infrastructure than is economically efficient. All consumer funded transmission should be assessed on an economic, net market benefits basis to provide a reliable framework in which generators can invest with confidence and that they will not be unduly affected by transmission related changes in competition.

NSW electricity consumers should not be burdened with higher electricity prices associated with interconnection projects that benefit other states. In the case of the 750MW SA-NSW interconnector, the project has a cost in the order of $1.5b, with $1.1b paid for by NSW consumers even though the bulk of benefits flow to SA consumers. A change in regulation around cost sharing being aligned with assessed benefits would be a more equitable approach with very large projects. A particular risk for NSW consumers is the Snowy 2.0 transmission projects. Whilst Snowy Hydro and its owner will face project risk, NSW consumers face the prospect of paying for ~$2b of transmission upgrades over 40 years. The prospect of Snowy 2.0 is crowding out other more appropriately sized, located and economic and storage projects and presents a barrier to entry to new investment that may deliver lower prices to consumers.

Distributed Generation

Rooftop PV is resulting in a number of issues that need to be addressed through tariff and regulatory reform:

i. energy based tariffs unfairly shift network costs to households without rooftop PV. Tariffs need to be restructured with some capacity type payment that improves pricing equity;
ii. the additional cost of network services (e.g. voltage control) should be reflected in the cost of rooftop PV systems; and
iii. rooftop PV is causing grid control issues that will require the network owner/AEMO to control the output of rooftop solar. Digital smart meters with remote PV panel switching may be required to allow the market operator to control rooftop PV when required for system security (AEMO's review should cover this issue).

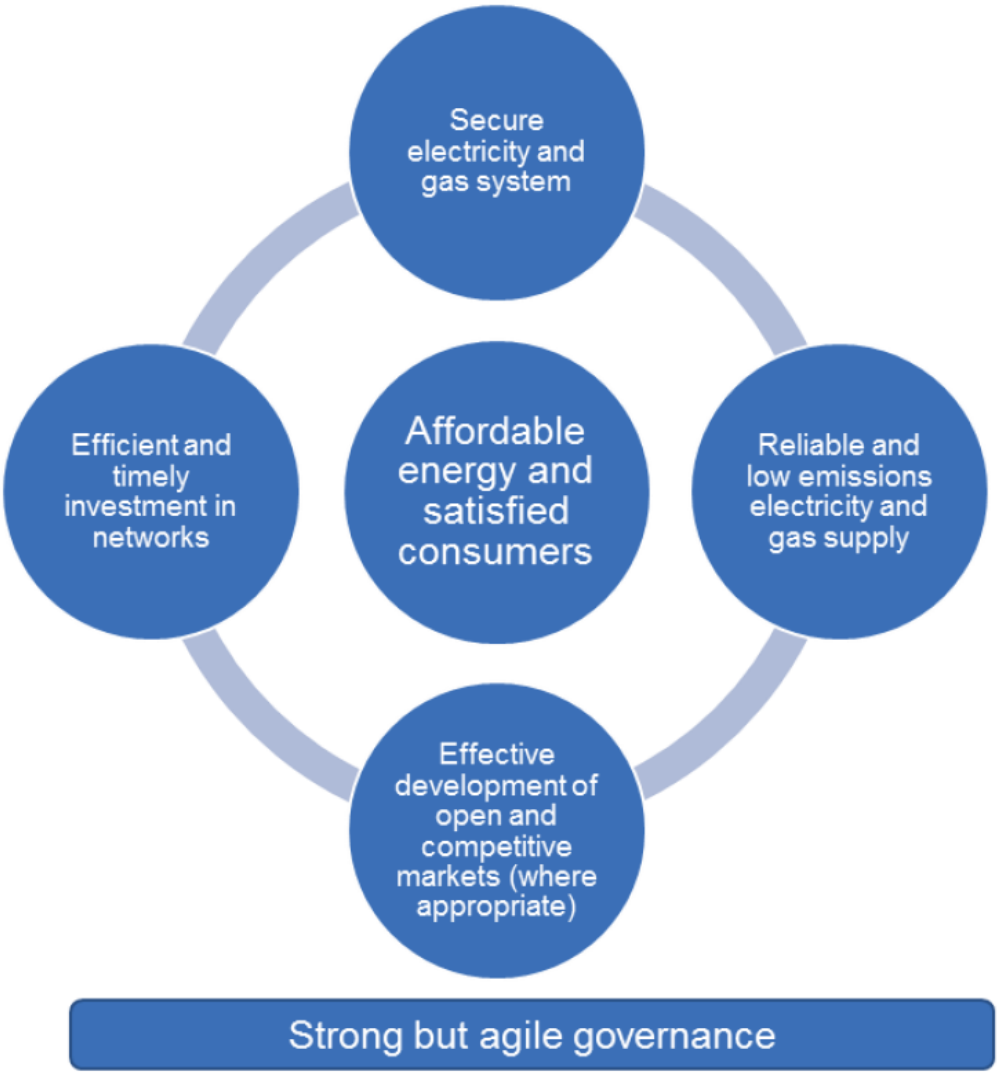
Small battery installations (behind the meter) do not need State Government support programs. Time-of-use pricing with appropriate metering, not direct subsidies, is sufficient for Retailers to advise customers on how to optimise a solar/battery installation.

Attachment 3

ROLE OF COAL FIRED GENERATORS IN SUPPORTING GREENHOUSE GAS EMISSION (GHG) REDUCTIONS

Coal fired generators currently supply 75% of NEM energy and are the principle source of system security services such as frequency and voltage control. In light of increasing VRE to meet GHG abatement targets, the Energy Security Board (ESB) has identified five high-level outcomes, broadly aligned with the Finkel Review recommendations, to ensure consumer confidence in Australia's energy system (Figure A3-1).

Figure A3-1 – ESB Strategic Plan outcomes

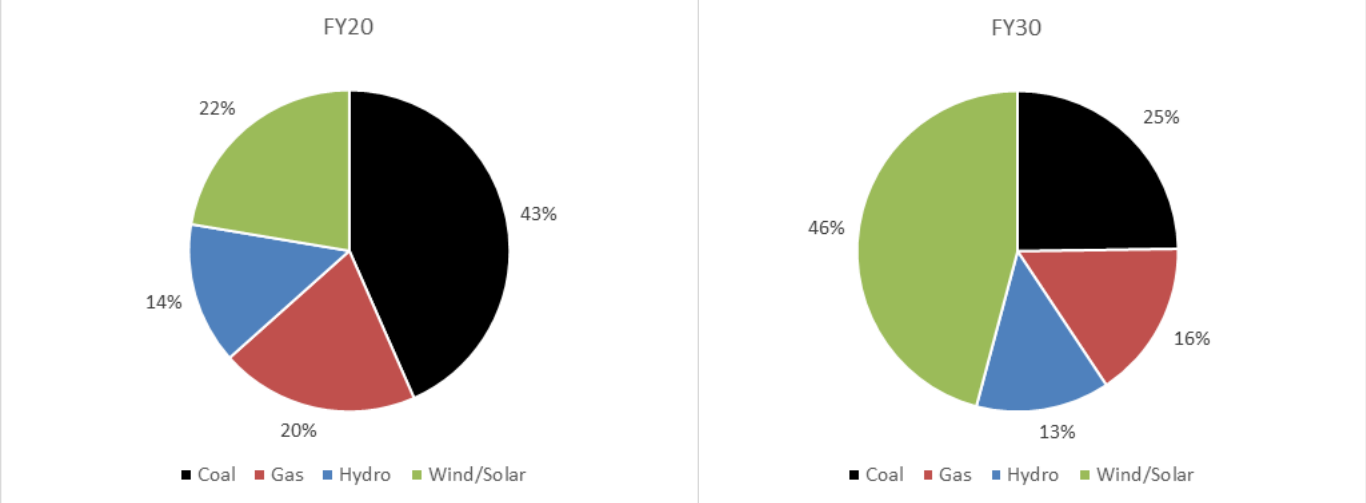


The ESB's strategic plan outcomes, and Labor's 2030 50% renewable energy target, cannot be achieved effectively or affordably without coal fired generation. Coal fired power stations will support GHG abatement and energy affordability by continuing to supply the lowest cost energy, providing the services critical to ensuring a reliable supply of energy to consumers, and through investment in projects that directly reduce GHG emissions. The discussion below explains in more detail the critical role coal fired power stations will play as VRE increases.

Energy Production and Affordability

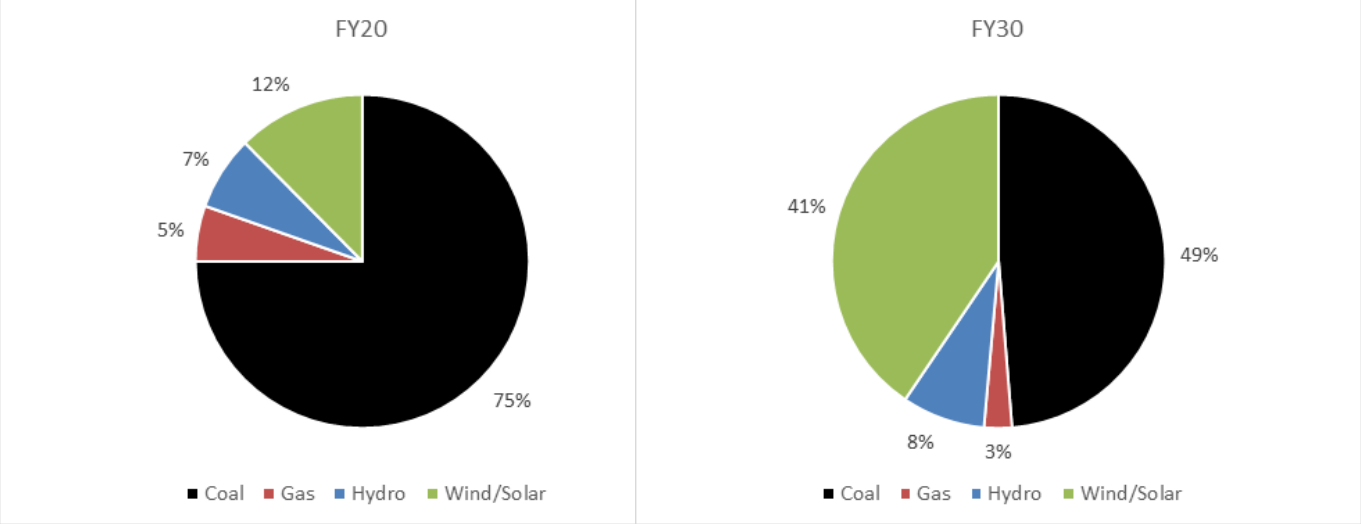
Figures A3-2 and 3 show the projected change in NEM capacity and energy from FY20 to FY30 from Delta's modelling under a 50% renewable target. The projection assumes the Snowy 2.0 pumped hydro energy storage scheme is operational from 2025. The modelling has 40TW of dispatchable capacity (down from 42,850MW in FY20) to meet reliability standards associated with a 10% probability of exceedance NEM peak of 38TW. The utilisation of much of this capacity is very low and unlikely to be sustained by the projected market prices.

Figure A3-2 – Change in capacity mix from FY20 to FY30



Note: Total capacity is 55TW in FY20 and 72TW in FY30. Retiring coal plant is largely replaced by Snowy 2.0 and gas peaking plant to maintain system reliability.

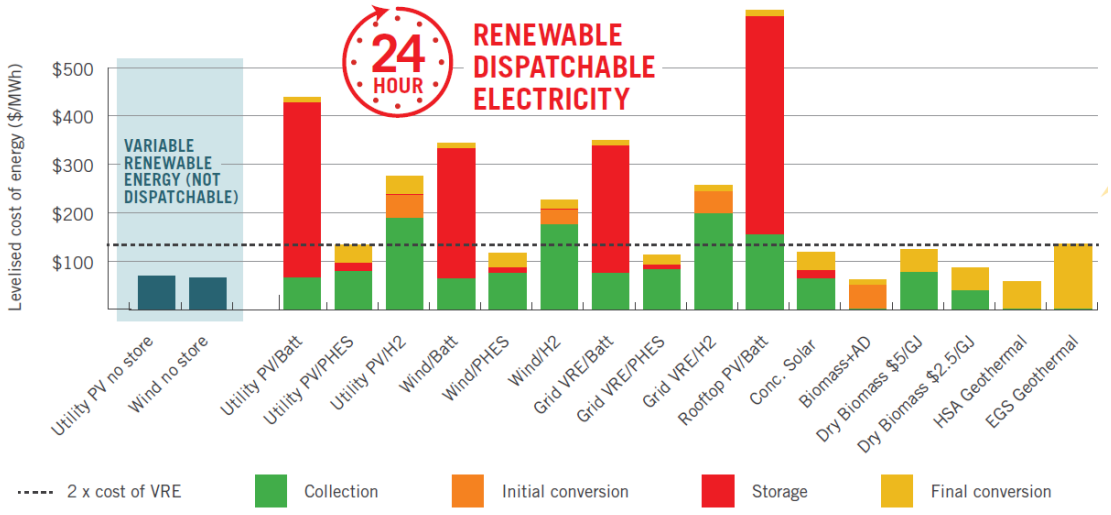
Figure A3-3 – Change in energy mix (NEM demand sent out is steady at ~190TWh/annum)



Even with an extremely ambitious renewable energy target, existing coal remains the single largest supplier of electricity over the next ten years.

In 2018 ARENA published a report on dispatchable renewable options. Figure A3-4 is an extract form the report that compares the cost of various options to firm VRE to provide 24-hour dispatchability. These estimates do not include the cost of power system security services or the cost of curtailment and marginal loss factors. The lowest cost option, apart from fuel limited biomass co-firing, is $135/MWh for large scale solar PV plus pumped hydro energy storage.

Figure A3-4 – Estimates of dispatchable renewable energy (excludes cost of system support services)



Note: LCOE assume a WACC of 6.5%. Wind/solar energy cost assumption is $65/MWh.

Existing coal fired generation marginal and average costs are well below that of gas fired generation and dispatchable renewable energy as reported by ARENA. Affordability will be enhanced by ensuring coal fired generation is not forced into early closure. Longer term affordability will be enhanced through cost effective coal plant life extensions.

System Security and Reliability

The last section of this Attachment provides a summary of the system security and reliability services of coal fired generation and how the requirements for these services will grow with increasing VRE. Wind and solar farms cannot provide system security services without installing high cost additional ancillary equipment. Existing conventional plant can provide these system support services at a relatively low cost. These include:

(i) frequency control:
   a. small supply/demand imbalance and VRE output changes – regulation ancillary service spot market;
   b. loss of a power system element – contingency ancillary service spot market.

(ii) voltage control:
   a. to manage voltage profiles across the networks (no market for thermal generator capability); and
   b. will assist in managing low system voltages at time of high rooftop solar PV to avoid having to switch out transmission lines or installing new static reactive plant (no market for thermal generator capability);

(iii) inertia:
   a. ensures rate of change of frequency does not exceed limits (transmission network owners have obligation to provide inertia to satisfy AEMO's requirements);

(iv) ramp rate:
   a. high flexible dispatch that responds to very large changes in VRE over relatively short timeframes (no market currently);

(v) spinning reserve
   a. needed for credible loss of generation or load; and
   b. to cover extended periods of low wind and solar generation (no market currently).

Frequency control services can be offered into the ancillary services spot markets. There are eight markets in all for MW raise and lower services with different response times. The total value of the frequency control ancillary service markets is $200m/annum. There is no secondary derivative ancillary service market for hedging which means new investment in frequency control equipment would have to be on a merchant basis.

Coal fired generators provide most of their voltage control capability for free under the mandatory requirement of connection. Voltage control services are necessary for network control and the transmission businesses typical invest in voltage control equipment which is included in their regulated asset base.

There are no market arrangements for the supply of inertia, ramp rate capability or spinning reserve.

Description of Power System Security and Reliability

Security

The power system is secure when it operates within defined technical limits, even when a major power system element (generator, load or transmission) disconnects from the system causing fluctuations in frequency and voltage.

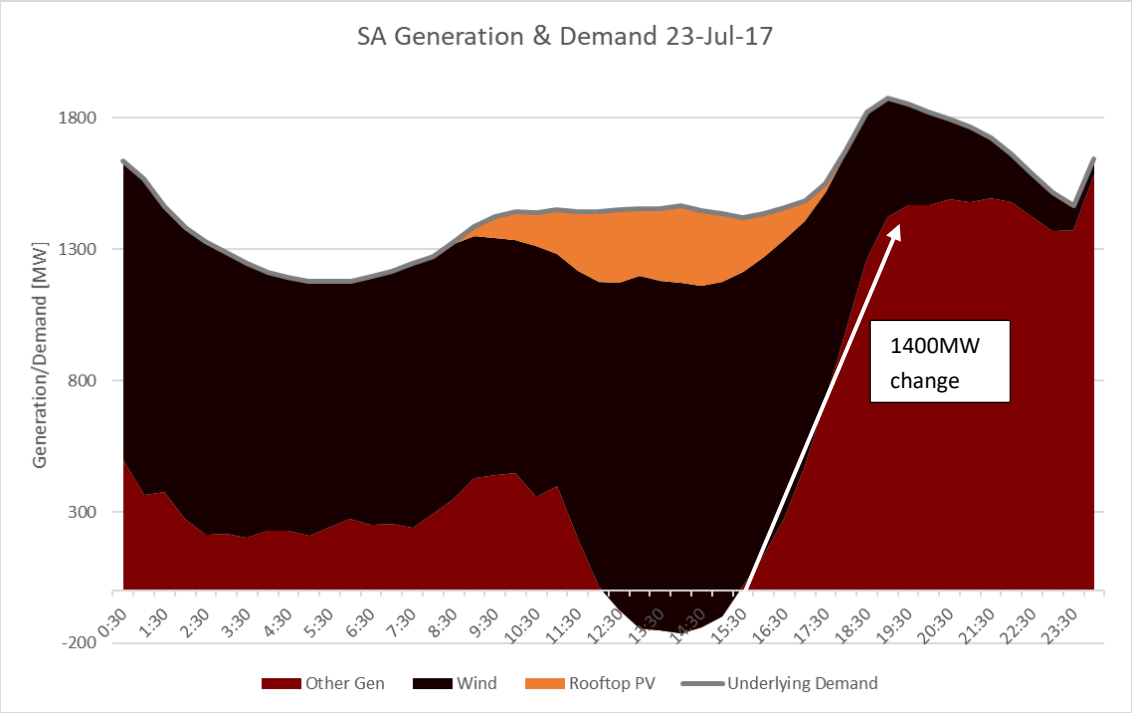
Without adequate frequency response (fast change in MW output) supplied from dispatchable generators, frequency could move beyond normal operating bounds risking power system collapse. Dispatchable thermal generators (together with inservice hydro units) are the primary source of frequency control. With a major event like the trip of a large generating unit, or the loss of a heavily loaded interconnector, the minimum response time is six seconds.

The variability of wind and solar is now creating a greater call on frequency response from coal fired power stations. This has manifested itself in constant small MW changes (e.g. +/- 20MW) for those thermal generators selected to frequency control. This type of frequency control does translate to increased maintenance costs from boiler stress (e.g. tube leaks) and throttle valve wear. Accordingly, most coal fired generators have set a frequency response dead band to reduce wear and tear. AEMO is only now looking at increasing the amount of frequency control services required, which will increase ancillary service prices and elicit increased supply.

A characteristic of conventional generators is inertia, which is resistance to a change in frequency due to their large spinning mass. Inertia reduces the rate of change of frequency post an event, allowing time for the delivery of replacement MWs in the case of a unit trip, or reduced loading for a loss of load. Without adequate inertia in the power system provided by the coal fired generators, changes in system frequency could be too fast to control, placing the power system at risk. Batteries can provide 'synthetic inertia' with their very fast MW response (less on 0.2 seconds), but are limited by their MW size and storage capacity.

As the amount of grid scale wind and solar increases so too does the size of MW swings in their collective output. Figure A3-5 shows an example from SA when wind and solar output decreased by 1000MW in the space of a few hours, as demand increased by 400MW. Vales Point can reliably deliver 5MW/min/unit (~300MW/hour) assuming it is lightly loaded. Currently there is sufficient ramp rate capability in the system but as the amount of wind and solar generation increases, the requirement for ramp rate capability from dispatchable plant will increase. Coal fired generation is well placed to provide ramp rate services.

Figure A3-5 – Example of a typical SA high wind change day (wind + solar MW decrease)



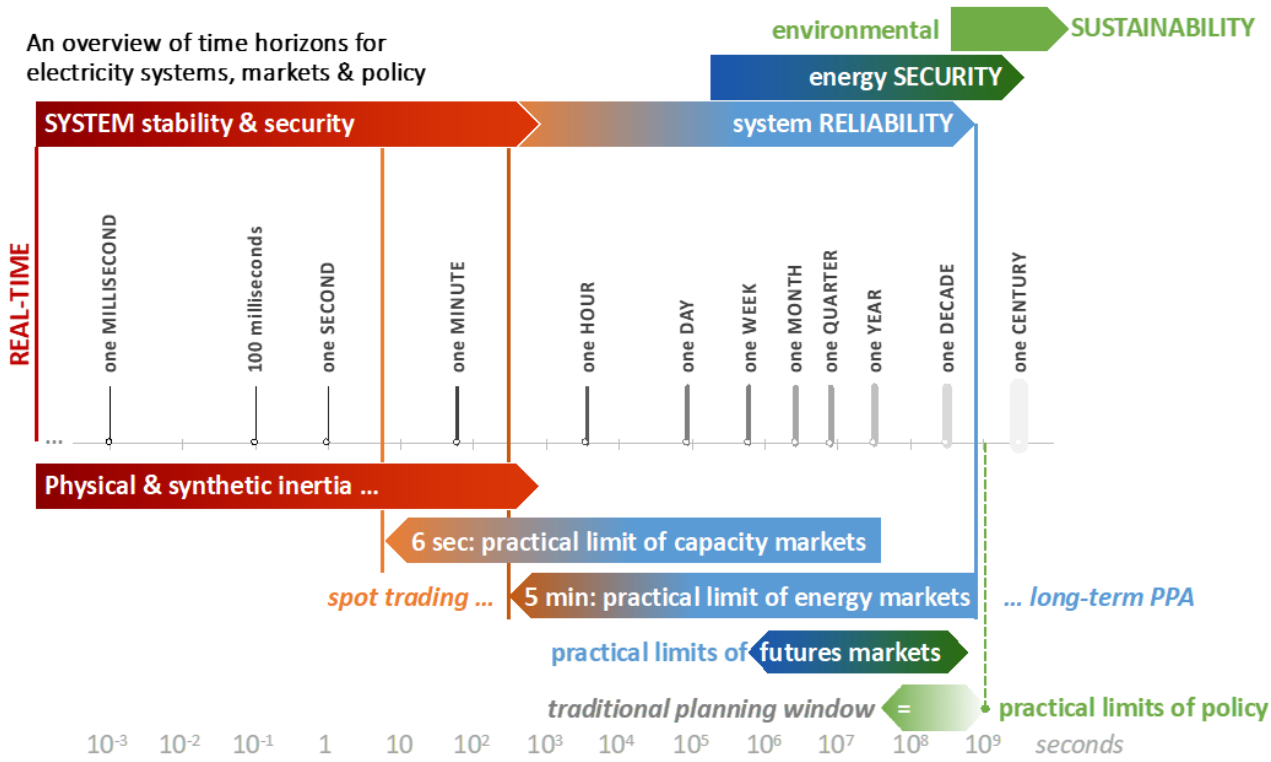
One of the reasons for the SA blackout in 2016 was the tripping of wind generators due to voltage fluctuations. Large voltage fluctuations can occur with the trip of a transmission line or when there is a fault in the network. Coal fired generators are better able to withstand changes in system voltage and provide low cost voltage control at their connection points. The generator itself can inject or absorb reactive power to control voltage and the generator transformer will have a range of windings taps than can be remotely selected to change grid voltage. Without this service, the networks would need to install high cost replacement equipment to ensure voltage is controlled within technical limits.

Reliability

A reliable power system has enough generating capacity and demand response to supply customer needs. A consequence of an unreliable power system is interruption to supply. Before VRE, reliability of the power system was maintained by carrying sufficient spinning reserve to cover generator trips and by having standby reserve such as hydro and gas plant to cover an extended unplanned thermal generator outage. Demand response, like the planned interrupting of an aluminium smelter potline, can help maintain reliability but only for a limited time.

Figure A3-6 presents the relationship between reliability and security requirements as time continuum.

Figure A3-6 – Time horizons for power system security and reliability response.



Source: CAPEOTWAY Associates presentation to Delta Electricity 2 May 2019

In a standalone power system like NEM (i.e. not interconnected to another country), there needs to be sufficient 'firm' capacity to supply customers when VRE is at a minimum (zero MW for solar and ~5% of total wind capacity). This firm capacity must also take account of unplanned generator outages and be dispatchable given the variability of wind and solar. As seen in other electricity markets with high levels of VRE, high VRE penetration corresponds to spot price volatility (occasional very low prices) and low average prices. An energy only market model, which relies on a supply curve of increasing marginal costs to provide investment signals, is not well suited to an energy policy which separately incentivises investment in zero marginal cost generating capacity.

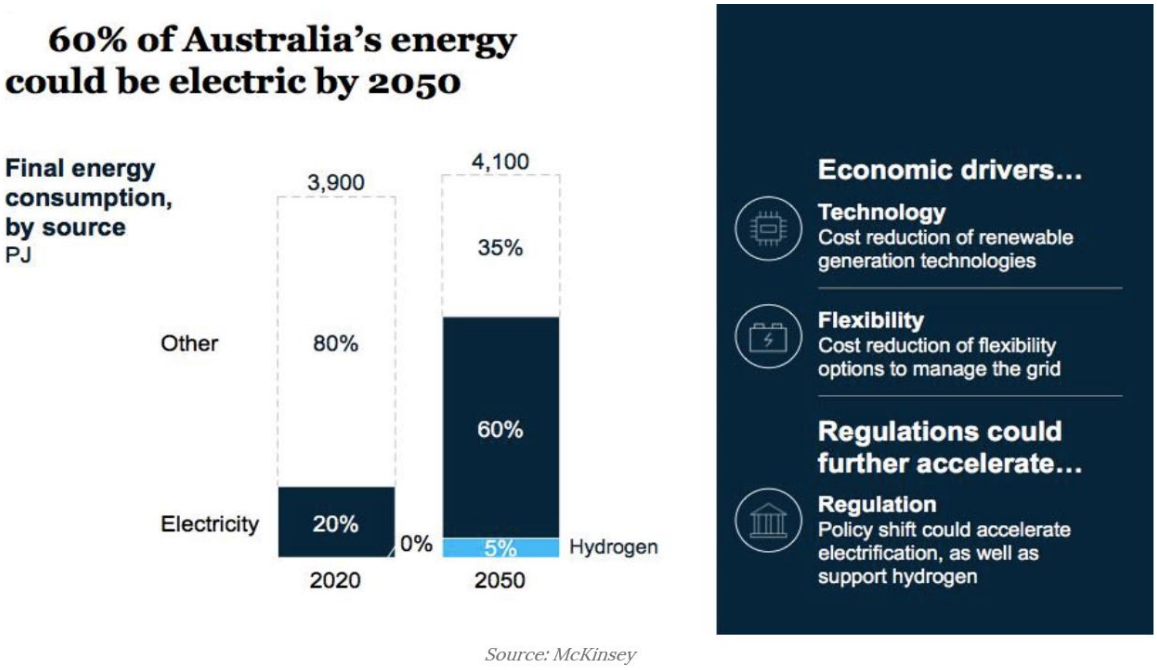
The early retirement of Northern power station is an example of the impact of VRE. Northern closed due to insufficient market returns in a region of high VRE, even though it provided critical power system security and reliability services. Post closure, AEMO is regularly intervening in the market to maintain system security at a cost of ~$34m/annum[19] for interventions and another $30m/annum[20] for the reserve trader. With the closure of Northern power station, the Riverlink project is now

[19] Load shedding in Victoria on 24 and 25 January 2019. AEMO April 2019.
[20] AEMC Investigations into direction mechanisms, April 2019.

deemed economic and is likely to go ahead at a cost of $1.6b, and ElectraNet has committed of around $80m in inertia services. The high levels of VRE in SA is only possible with the interconnection to VIC and consistent AEMO intervention. Even with the interconnection, the 2200MW of wind and solar capacity is often curtailed to 1295MW

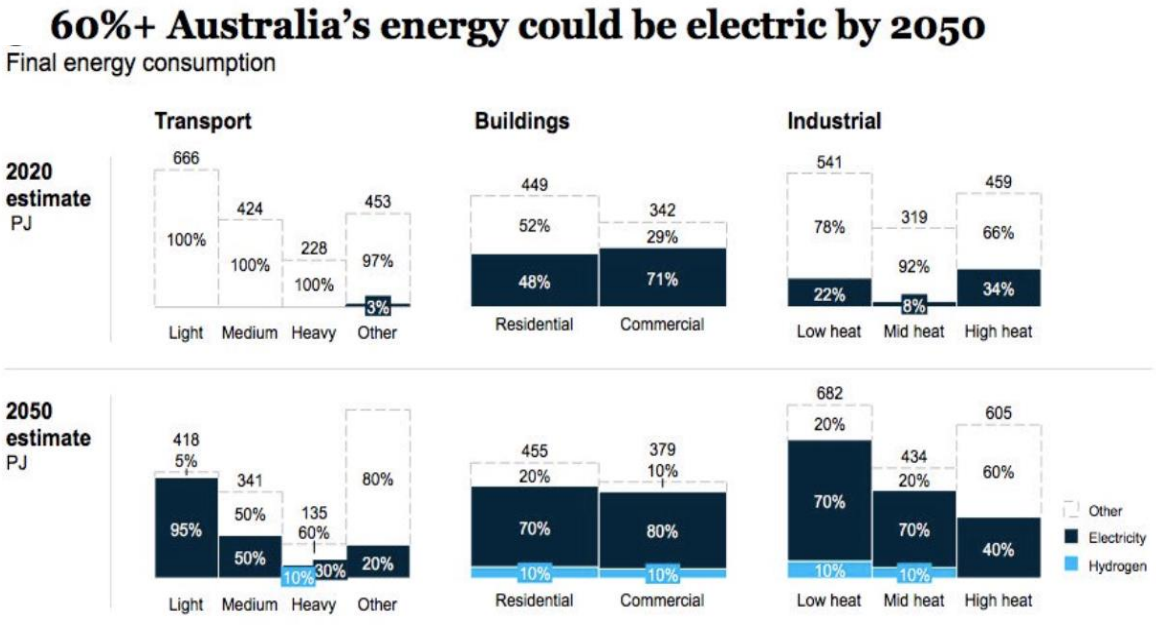
Attachment 4

OPPORTUNITIES FOR ELECTRIFICATION OF NON-ELECTRICITY SECTORS



Source: McKinsey

Source: McKinsey and Co, presenting at the Australian Energy Week conference in Melbourne (June 2019)



Source: McKinsey and Co, presenting at the Australian Energy Week conference in Melbourne (June 2019)