Submission No 237

SUSTAINABILITY OF ENERGY SUPPLY AND RESOURCES IN NSW

Organisation: Nature Conservation Council of NSW

Date Received: 20 September 2019

Nature Conservation Council
The voice for nature in NSW

Dear Committee,

Re: Inquiry into the sustainability of energy supply and resources in NSW

The Nature Conservation Council of New South Wales (**NCC**) is the state's peak environment organisation. We represent over 150 member organisations across NSW. Together we are dedicated to protecting and conserving the wildlife, landscapes and natural resources of NSW.

NCC welcomes the opportunity to make a submission to this important and timely inquiry, and would also welcome the opportunity to address the committee in person to expand upon the evidence in this submission and take questions from committee members.

The capacity and economic opportunities of renewable energy.

NCC has completed a study into the opportunities for NSW from transitioning to clean energy.

Findings of this work are contained in the report *Repowering our Regions*, and the methods and assumptions are available in the *Repowering our Regions technical report*. Both reports are attached to this submission and are available at http://nature.org.au/regions-report.

The report highlights the huge opportunity for regional jobs and regional economies in embracing the transition to 100% clean energy by 2030. If this occurs, we will:

- create 22,000 full time jobs each and every year in NSW,
- secure $25 billion of investment in regional NSW, and
- save 60 million tonnes of carbon pollution each year.[1]

To estimate jobs figures, the technical report assessed 52 projects at various stages of the development process in NSW, providing a robust and up-to-date estimate of jobs per MW for wind and solar farms.

We note that we did not include the jobs benefits of:

- balancing technologies such as batteries and pumped-hydro, as data is scarce;
- transmission and distribution upgrades, such as the links proposed in the AEMO Integrated System Plan,
- manufacturing jobs. The extent that manufacturing of clean energy components can be scaled up locally rather than imported depends on long-term policy settings.

[1] Repowering Our Regions, Nature Conservation Council, 2017. Available at https://www.nature.org.au/our-campaigns/climate-and-clean-energy/repowering-our-regions-a-clean-energy-road-map-for-nsw/

Therefore far more jobs potential exists than our estimates, if policy settings support a jobs-rich transition to clean energy.

The report also assessed the regions in which these jobs are likely to be located. We note that Australia's Renewable Energy Zones (REZ) rarely align with current coal mining areas, so while the renewable energy industry can create economic activity in the regions, large-scale renewable jobs are not a drop-in replacement for existing coal workforce and additional measures to ensure economic diversification of coal mining areas will be necessary to ensure that workers and communities who have contributed so much to our state's development are not left behind.

Large additional employment opportunities exist in manufacturing and supply chains. Examples are Keppel Prince Engineering - a wind turbine tower manufacturer in Geelong, Wilson Transformers in Wodonga, and Sonnen Batteries in South Australia. These industry opportunities can be maximised by policy certainty, as well as including criteria that preference local procurement in government renewable energy support policies. Policies such as reverse-auctions or tenders in ACT, South Australia and Victoria have demonstrated the success of this model. Unfortunately NSW has not yet implemented policies that provide long-term industry certainty, or promote local procurement, and hence is missing out on these job creation opportunities.

While clean energy backed up with storage is now the cheapest new form of firm energy generation, significant barriers exist to the industry in NSW which the NSW government has a role in overcoming. This includes a lack of transmission infrastructure, a slow transmission planning and approval process, lack of investment certainty due to a policy uncertainty, and a lack of market incentives for dispatchable clean energy sources.

Recommendation 1
That NSW expand its transmission strategy to all NSW renewable energy zones identified in the AEMO Integrated System Plan.

Recommendation 2
Establish a transmission infrastructure fund to provide seed funding to accelerate planning and construction of transmission infrastructure and enable a robust renewable energy industry to grow in NSW renewable energy zones.

Recommendation 3
Support dispatchable clean energy by tendering for new plants to come online. 7.5 GW of additional storage will be needed in NSW to back up a 100% renewable energy grid by 2030.

Recommendation 4
Provide 1 GW per year of reverse auctions for clean energy generation with criteria for local procurement to help establish clean energy manufacturing in NSW.

Effects on regional communities, water security, the environment and public health.

a) Renewable energy

NCC's Repowering our Regions report assesses the required land area that would be used by solar farms under a 100% clean energy scenario and finds it to be minor: 500 km2 (50,000 ha) out of NSW's total land area of 809,500 km2. Nevertheless, land use conflicts do arise, especially where good solar resources and power transmission or distribution infrastructure overlays with good quality agricultural land. Fortunately solar farms can and do co-exist with agricultural uses, a field known as agrivoltaics. For example Mugga Lane solar farm in the ACT also works with local producers to graze sheep and keep bees on the same land that is producing solar energy[2].

b) Coal-fired generation - climate impacts

In order to avoid the worst impacts of dangerous climate change, the world must rapidly transform our energy systems to stop burning fossil fuels.

Increased CO_2 levels in the Earth's atmosphere are causing rapid heating of the atmosphere and oceans, the breakup of ice sheets, glacial retreat, sea level rise, and ocean acidification. Australia is experiencing the direct impacts of climate change with more severe and frequent events such as droughts, bushfires, heat-waves and floods.

A rapid transformation of our energy system is required if we are to avoid the worst risks and impacts that climate change poses to human and natural systems. Warming of over 1.5°C is incompatible with the survival of entire low-lying pacific island nations such as Kiribati and Tuvalu, as well as coral reefs in Australia and around the world.

Australia is one of over 190 countries who have committed to the 2015 Paris Agreement goal (article 2, section 1a) of:

> *"Holding the increase in the global average temperature to **well below 2°C** above pre-industrial levels **and pursuing efforts to limit the temperature increase to 1.5°C** above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change"*[3]

[2] https://reneweconomy.com.au/act-solar-farm-announces-new-tender-for-sheep-19044/
[3] "Paris Agreement", United Nations, 2015. Article 2, section 1(a). Available at https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf

The NSW and Australian Governments have not yet publicly released any assessment of action is required by our state and country to achieve these goals, however international organisations have provided some direction as to the rapidity of the transition required in Australia to do our fair share to meet this goal.

Climate Action Tracker (CAT) rates the sufficiency of national government's climate commitments and policies. They state:

> *Australia's current policies in 2017 are not consistent with holding warming to below 2°C, let alone limiting it to 1.5°C as required under the Paris Agreement, and are instead consistent with warming between 3°C and 4°C: if all countries were to follow Australia's approach, warming could reach over 3°C and up to 4°C.*[4]

Warming of 3 to 4 degrees would be catastrophic for people and nature.

Doing our share to meet the Paris goals and avoid dangerous global warming clearly means planning a phase out of coal-fired power stations across Australia, including the aging and emissions-intensive NSW fleet.

International Energy Agency modelling of the 2-degrees scenario demonstrates that coal-fired power plants in OECD countries must be almost entirely phased out by 2035[5]. In order to pursue efforts to limit temperature rises to 1.5°C, as we agreed in Paris, the timeline must be even shorter.

The *Powering Past Coal Alliance,* led by the UK and Canadaian governments and 28 other national governments, recognises this in setting their timeline at a complete phase out of unabated coal power in OECD and EU countries by 2030, and in developing countries by 2050[6].

The 2030 phase out of coal power timeline is supported by Climate Analytics analysis[7].

The business-as-usual closure schedule for NSW is shown in figure 1, based on announced closure dates and a 50 year technical lifetime for Mt Piper and Vales Point, which don't have announced closure dates. This schedule is not compliant with 1.5 degrees or 2 degrees warming targets.

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[4] Climate Action Tracker, accessed 20/9/2019. Available at https://climateactiontracker.org/countries/australia/fair-share/

[5] International Energy Agency, Energy, Climate Change and Environment 2016 Insights report, p30, http://www.iea.org/publications/freepublications/publication/ECCE2016.pdf

[6] https://poweringpastcoal.org

[7] Climate Analytics (2016). Implications of the Paris Agreement for Coal Use in the Power Sector, p17. Available at https://climateanalytics.org/media/climateanalytics-coalreport_nov2016_1.pdf

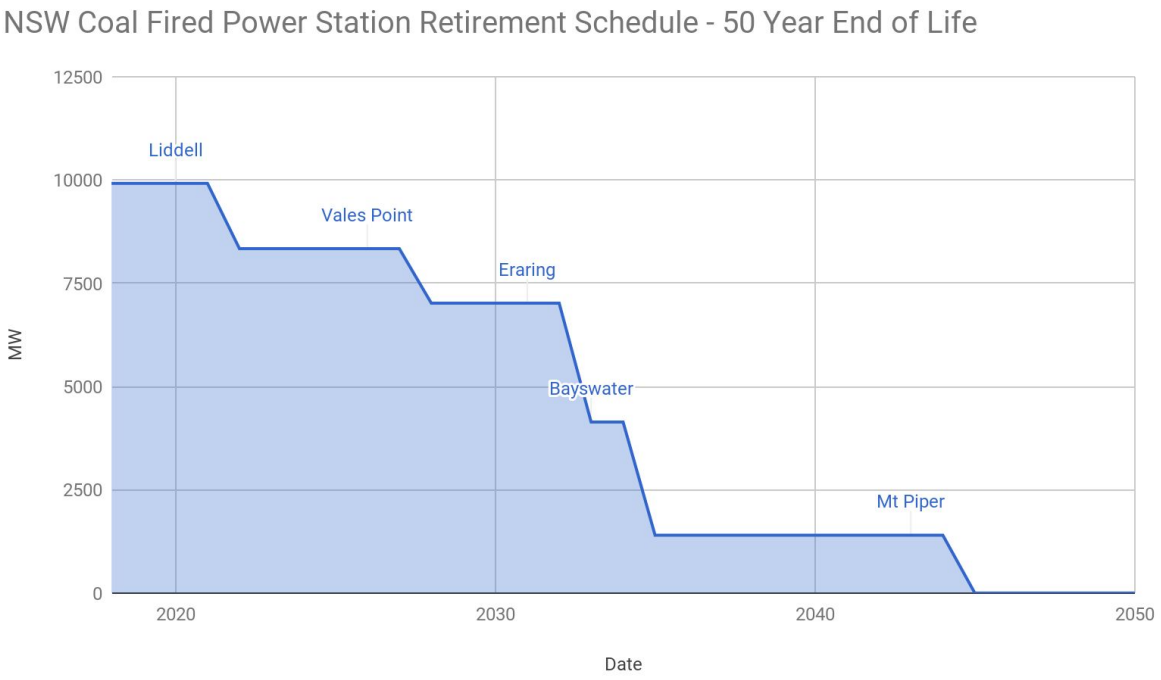

Figure 1- Business as usual coal power station retirement schedule.

We note that even in this business as usual scenario, a significant investment in dispatchable clean generation will be required, especially by the early 2030s as NSW's two biggest coal fired power stations close.

Figure 2 below shows a 1.5 degrees compliant coal phase out schedule where one coal-fired power station must close every two years for a smooth transition.

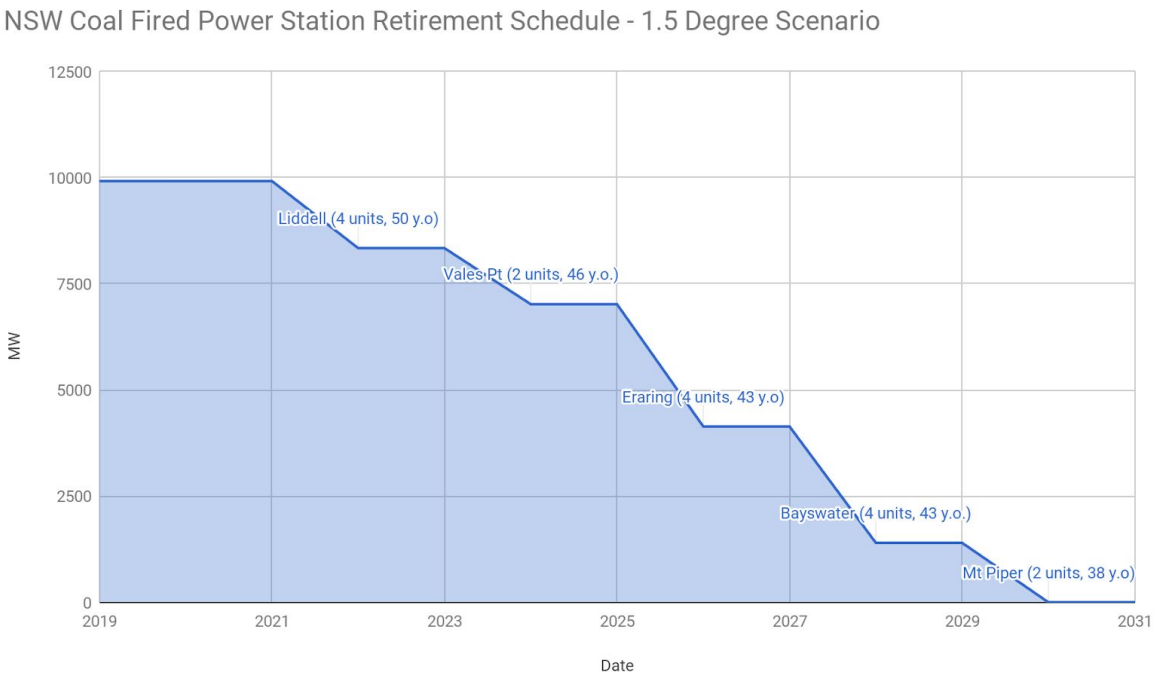

Figure 2 - 1.5 degrees compliant coal fired power station retirement schedule.

Recommendation 5
The NSW Government commission an independent study of the timeline and roadmap for a 1.5 degrees compliant emissions reduction pathway for NSW electricity generation and for the broader NSW economy.

Recommendation 6
The NSW Government legislate binding 5 yearly interim targets for emissions reduction in the NSW economy, in line with a 1.5 degree compliant emissions reduction pathway.

Recommendation 7
The NSW Government sets a policy for a phase-out of NSW coal-fired power stations and a complete transition to renewable energy by 2030.

Recommendation 8
The NSW Government implements mechanisms to achieve an orderly retirement of coal plants and replacement with clean energy such as reverse-auctions amongst generators, generator age limits and emissions intensity limits.

c) Coal-fired generation - air pollution and human health impacts

Coal-fired power stations also have a significant impact on the health of neighbouring communities and the population more broadly. The Climate and Health Alliance estimates the annual costs of associated health damages from coal-fired power station air-pollution in the Hunter Valley and Central Coast at around $600 million per annum[8].

The health impacts of air pollution include increased asthma and respiratory disease (the Hunter Valley has the highest rates of emergency department attendance and hospital admission for asthma and respiratory disease in NSW[9]), impaired lung growth, impairment of brain development in babies and small children, low birth weight and adverse birth outcomes, heart attack and stroke (the Hunter Valley has the highest rates in NSW of hospital admission and death from cardiovascular disease), upper respiratory tract irritation and infection, and worsening of existing health problems in people with chronic disease. People most susceptible to the impacts of air pollution are children, pregnant women, elderly people and people with chronic disease.

Coal-fired power plants produce a range of toxic pollutants that harm people and the environment.

Fine particles of coal dust - PM10 and PM2.5 - are made up of all the air pollutants associated with coal combustion and are drawn deep into the lungs and bloodstream, causing lung cancer, heart attack, stroke, and a range of respiratory diseases.

PM2.5 travels long distances, meaning it kills and harms people in communities near to the power station and also impacts the millions of people living in cities hundreds of kilometres away. Research by Australian Nuclear Science and Technology Organisation (ANTSO) found that up to half of sulphate pollution in Sydney is from coal-fired power stations in NSW, and 18% of the total PM2.5 load breathed by Sydney residents[10].

Coal plants are also significant emitters of sulfur dioxide (SO_2) and nitrogen oxides (NO_x) which cause respiratory and cardiovascular disease. A range of other toxic pollutants are emitted from coal plants such as mercury which harms communities and the environment.

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[8] Climate and Health Alliance, Coal and Health in the Hunter, 2015, p32, available at: http://d3n8a8pro7vhmx.cloudfront.net/caha/legacy_url/53/Climate-and-Health-Alliance_Report_Layout_PRINTv2.pdf?1439938112

[9] NSW Department of Health, Respiratory and cardiovascular diseases and cancer among residents in the Hunter New England Area Health Service, 2010, available at: http://www.health.nsw.gov.au/environment/Publications/HNE-Respi-Cardio-Disease.pdf

[10] ANSTO, Revealing the sources of Sydney's air pollution, 2014, available at: http://www.ansto.gov.au/AboutANSTO/MediaCentre/News/ACS049674

Sulfur dioxide levels in communities near coal fired power stations regularly exceed the World Health Organisation (WHO) guideline for healthy air of 7 parts per billion[11]. NCC analysis of industry data revealed that SO_2 levels in Wyee on the Central Coast exceeded the WHO standard for SO_2 on six occasions in 2018[12].

Pollution from coal plants is poorly monitored and regulated and maximum allowed levels are not set low enough to protect human health.

Currently NSW has a load-based licencing scheme, which requires polluters to pay in order to pollute. In this way it functions as a pigovian tax. However, the level of the fees is 49 times lower than the actual health cost of pollution, which is transferred to the community[13].

Mining for coal and minerals in NSW is not currently captured by the LBL scheme, and we see this is as a significant gap in the regulation of polluting industries in NSW. Coal mining is responsible for a significant proportion of damaging pollutants in NSW including air pollution from particulate matter (PM_{10} and $PM_{2.5}$), volatile organic compounds (VOCs) and sulphur and nitrogen oxides (SO_X and NO_X), and water pollution from trace metals such as arsenic, chromium, selenium, mercury and lead.

Recommendation 9
Increase NSW load-based licencing fees for pollution to 49 times their current level so that they reflect the actual health costs of pollution that is currently borne by the public, and incentivise world's best practice pollution control.

Recommendation 10
Include mining for coal and minerals in the NSW load-based licencing scheme for pollution.

Recommendation 11
Require coal-fired power stations to fit best practice pollution controls such as flue-gas desulfurisation for the removal of SO_2 and selective catalytic reduction for the removal of NO_X.

d) Coal-fired generation - coal ash

Continued coal-fired power generation is creating a growing legacy of toxic ash. In Australia, 5.8 million tonnes of coal ash was disposed of in 2014-15, which is 22% of all waste

[11] Draft Variation to the National Environment Protection (Ambient Air Quality) Measure for sulfur dioxide, nitrogen dioxide and ozone, Impact Statement, Table 6-2, p45, National Environment Protection Council, May 2019.

[12] https://www.nature.org.au/media-releases/2019/08/vales-point-air-pollution-exceeds-world-health-organisation-pollution-standards-six-times/

[13] Doctors for the Environment, Submission to the NSW EPA on the Clean Air for NSW Consultation Paper, January 2017, available at https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/air/submissions2017/doctors-for-the-environment.pdf

disposed in Australia and the third largest waste stream behind construction and demolition waste (7.1 Mt) and municipal waste (6.5 Mt)[14].

The enormous quantities of coal ash produced by coal-fired power stations, combine with the toxicity of the ash to create a high-risk waste stream.

Globally, the consequences of storing millions of cubic metres of toxic ash in aging, unlined dams have been varied. They can be in the form of catastrophic spills, such as the biggest toxic waste spill in United States history, the 2008 Kingston spill in Tennessee. Four million cubic metres of toxic coal ash was released when a dam wall collapsed, smothering a valley including homes, the Emory River and the surrounding environment.

The environmental harm is more often far less visible, but even harder to remediate, due to the tendency of heavy metals to leach from coal ash into groundwater and surface water. For example, Physicians for Social Responsibility document tens of cases of toxic pollution from coal ash dams[15].

Millions of tonnes of toxic ash is stored in dumps close to the power stations in NSW, posing an ever-growing threat to nearby communities and polluting local waterways and groundwater.

Groundwater contamination is now known to be commonplace at unlined coal ash storages globally.

In light of this, the US EPA has required ash dams, including existing ash dams, to upgrade to engineered landfills lined with composite membranes to slow contamination of groundwater.[16]

Recommendation 12
Upgrade coal ash dams in NSW to global best practice by installing an engineered composite membrane to reduce leaching as much as possible. If water ingress can't be reduced, installing a leachate collection system may also be necessary, and conducting more rigorous groundwater monitoring to include the range of heavy metals typically found in coal ash.

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[14] Australian National Waste Report 2016, Department of the Environment and Energy & Blue Environment Pty Ltd, Page 15

[15] Physicians for Social Responsibility, "Coal Ash: the toxic threat to our health and environment", 2010, available at https://www.psr.org/blog/resource/coal-ash-the-toxic-threat-to-our-health-and-environment/

[16] US Federal Register volume 80, number 74, "EPA Hazardous and Solid Waste Management Systems: Disposal of Coal Combustion Residuals from Electric Utilities", 21302–21501 available at: https://www.gpo.gov/fdsys/pkg/FR-2015-04-17 accessed 26 September 2018

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We trust this information is helpful for the committee.

For further information or to arrange evidence at a committee, please contact Brad Smith, Campaigns Director on [redacted].

Warm regards,

[redacted]

Dr. Brad Smith,
Campaigns Director, Nature Conservation Council of NSW

Attachments included with submission

Repowering Our Regions, Nature Conservation Council of NSW
Repowering Our Regions: Technical Report, Nature Conservation Council of NSW