Submission No 30

INQUIRY INTO PROTECTION OF THE ENVIRONMENT OPERATIONS AMENDMENT (CLEAN AIR) BILL 2021

Organisation: Nature Conservation Council of NSW

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Nature Conservation Council
The voice for nature in NSW

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Portfolio Committee No. 7
NSW Parliament House
email: portfoliocommittee7@parliament.nsw.gov.au

Dear Committee,

Submission to Inquiry into Protection of the Environment Operations Amendment (Clean Air) Bill 2021

The Nature Conservation Council of New South Wales (NCC) is the state's peak environment organisation. We represent over 160 environment groups across NSW. Together we are dedicated to protecting and conserving the wildlife, landscapes and natural resources of NSW.

As NSW Environment Minister Matt Kean has said "*everyone who lives and works in NSW deserves to breathe clean air".*[1]

While most of NSW enjoys good air quality, there is no safe level of air pollution. Coal-fired power stations emit toxic pollutants that cause a range of diseases in the people of NSW. Pollution from coal-fired power stations is the most significant controllable source of air pollution in NSW.[2]

Air quality in the NSW Hunter Valley regularly fails to meet national air quality standards, in part due to the concentration of coal-fired power stations in the region.

The health impacts of air pollution are enormous. Exposure to even low concentrations of pollution causes or contributes to adverse health impacts, including premature deaths.[3] Air pollution is a major public health issue and the consequences of not addressing it are felt by people suffering with respiratory and cardiac disease every day. An annual cost of AUD$1.4 billion means that air pollution also hurts the NSW economy.[4]

More responsible regulation of air pollution from coal-fired power stations is needed to reduce the burden of disease, so that the people of NSW can enjoy longer, healthier lives.

Technology that cuts pollution by over 90 percent is readily available and widely used overseas, because it is required by regulators and lawmakers in those jurisdictions.

There is no reason why people living in Australia deserve to have lower levels of protection from air pollution than people living in countries like Japan, the USA, Europe, or China.

The Nature Conservation Council of NSW supports the bill and recommends that the Committee:

1. recommends that the Clean Air Bill be passed by Parliament
2. consider all avenues for driving down air pollution, such as the NSW Load Based Licencing Scheme, implementing world's best emission control practice, and removal of exemptions to pollution limits for all NSW coal-fired power stations
3. establish a clear timeline of operators' existing and projected major upgrades and maintenance overhauls to help inform when pollution control technologies can be installed at each coal-fired power station to comply with the limits set out in the Bill.

Your key contact point for further questions and correspondence is Ishbel Cullen, Policy and Outreach Coordinator, available via and . We welcome further conversation on this matter.

Yours sincerely,

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Chief Executive
Nature Conservation Council

1. Current regulation of air pollution from coal-fired power stations in NSW

Both ambient air quality (the air we breathe) and point-source emissions (pollution from smoke stacks) are regulated in Australia. However, the existing standards are not in line with best-practice or with health guidelines. Stricter limits on point sources of air pollution will result in better ambient air quality and less harm to human health.

In NSW, the Protection of the Environment Operations (Clean Air) Regulation 2010 and the environment protection licences of polluting facilities are the two key regulatory instruments limiting air pollution from coal fired power stations. However, neither of these instruments is currently effective at achieving best-practice pollution reduction.

Despite an increasing evidence base of health science that demonstrates the harm to human health that air pollution causes, there have been no substantive amendments to the Protection of the Environment Operations Act (POEO Act) or the Clean Air Regulation since it was implemented over a decade ago. This bill is therefore timely.

There are also no prescribed standards for sulphur dioxide and mercury in NSW environment protection legislation for electricity generating coal-fired power stations, despite these two pollutants being associated with severe health risks.

NSW coal power stations are old and will come to the end of their lives in the next thirty years. Mount Piper's listed closure date of 2042. Vales Point's owners have a life extension plan to 2049. In 2023 when Liddell closes, people in the nearby towns of Singleton and Muswellbrook will enjoy substantially healthier air. Lawmakers must not rely on the eventual retirement of these polluting sources of energy to address the health impacts that they have. Such a course of inaction would result in thousands of cases of avoidable deaths and childhood asthma in the intervening decades.

2. Current emission limits for coal-fired power stations

Although inadequate, the current Clean Air Regulation prescribes more stringent standards for newer coal-fired power stations. Tables 1 and 2 below summarise the grouping of each NSW coal-fired power station and the standards of concentration prescribed in the Clean Air Regulation that apply to each Group.[5]

Table 1: Clean Air Regulation groupings for NSW coal fired power stations

Station	EPL No.	Commission (alteration) date	POEO Grouping according to year of commission / alteration
Mount Piper	13007	1993	Group 4
Eraring	1429	1982 (2006)*	Group 6*
Bayswater	779	1985-1986	Group 3
Vales Point	761	1978	Group 5*

Liddell	2122	1971-1973	Group 5*
Redbank***	11262	2001	Group 5

* Eraring power station made an application in 2006 for a major upgrade that was completed in 2011-12, which set it in Group 6 under the regulation. However, the owners (at the time a government owned corporation) argued and were granted an exemption to group 6 in accordance with section 33 (3) of the POEO Clean Air Regulation 2010. The power station is taken to belong to group 3, but with somewhat more stringent emission limits set in its licence. In practice, the low NOx burners that were installed are so effective that it would also meet the more stringent Group 6 limits.

** In accordance with clause 35 of the Clean Air Regulation, coal-fired power stations that prior to 1 January 2012, belonged to Group 2 (including any coal-fired power station previously in Group 1) are taken to belong to Group 5. In accordance with clause 35, Liddell and Vales Point were granted a temporary exemption from Group 5 for the emission of nitrogen oxides.

*** Redbank is not currently operating, but does hold approvals to operate.

Table 2: Clean Air Regulation prescribed standards of concentration

Air impurity	**Standard of concentration (mg/m^3)**	
Solid particles (Total)	Group 1	400
	Group 2, 3 or 4	250
	Group 5	100
	Group 6	50
Nitrogen dioxide (NO_2) or nitric oxide (NO) or both, as NO_2 equivalent	Group 1, 2, 3 or 4	2,500
	Group 5	800
	Group 6	500

As noted beneath Table 1, the Clean Air Regulation allows for coal-fired power station operators to apply for exemptions from the prescribed standards.[6] We consider this to be a key weakness of NSW air pollution regulation.

Table 2 does not include standards of concentration for mercury or sulphur dioxide. This is because the Clean Air Regulation does not prescribe standards for these pollutants and they are instead regulated directly by the environment protection licences that apply to each coal-fired power station.

Under section 58 of the POEO Act, the EPA has discretion to issue exemptions to particular groupings, and to require more stringent emissions limits for solid particles and nitrogen

oxides than those prescribed in the Clean Air Regulation. Table 3 below, outlines the current licenced point source emission limits that apply to each coal-fired power station.

Table 3: Licenced point source emission limits for each NSW coal-fired power station

	Solid particles (mg/m^3)	**Nitrogen oxides (mg/m^3)**	**Mercury (mg/m^3)**	**Sulfur dioxide (mg/m^3)**
Mount Piper (Group 4)	50	1500	0.05	1700
Eraring (Group 6**)	50	1100	0.05	1700
Bayswater (Group 3)	50	1500	0.05	1700
Vales Point (Group 5*)	50	1500	0.05	1700
Liddell (Group 5*)	50	1500	0.05	1900
Redbank (Group 5)	82	799	2.5	649

The emission limits set in the licences for power stations as shown in Table 3, and the nitrogen oxide limits set in the POEO Regulation as shown in Table 2, are all far below international best practice.

This means that the limits set do not require power station operators to reduce emissions to the lowest practical levels, or to pursue best practice pollution reductions.

The Clean Air Bill proposes to specify standards of concentration for air pollutants from coal-fired power stations in the POEO Act itself, as opposed to the Clean Air Regulation. Its enactment would empower the EPA to regulate air pollution based on limits that are better designed to protect human health, and more in line with available modern pollution control technology.

2.1 Ratchet provisions under the Clean Air Regulation

The Clean Air Regulation contains ratchet provisions aimed at phasing out old polluting technology and processes over time.

Under the Clean Air Regulation, from 2012 any Group 2 coal-fired power station is taken to belong to Group 5.[7] This ratchet approach is designed to ensure that older coal-fired power stations in Group 1 and Group 2 are required to plan equipment upgrades and replacements to facilitate emissions reductions, because they use older technology that generates higher emissions.[8]

However, the Clean Air Regulation also provides for exemptions from this ratcheting approach and licensees of Group 2 coal-fired power stations can apply to be exempt from Group 5 emission limits.[9] Once granted, an exemption lasts for five years and a licensee can apply to have the exemption extended.[10]

The Clean Air Regulation has no ratcheting clause for Group 3 or Group 4 polluting facilities. Facilities such as Bayswater and Mt Piper power stations have not been required to fit even modest nitrogen oxide control technologies, let alone best practice.

3. The impacts of exemptions to emission limits

For 10 years, Delta Electricity's Vales Point Power station has operated under an exemption to emit nitrogen oxide at almost twice the NSW legal limit. This exemption has allowed Vales Point's operators to avoid substantially improving pollution control technology as the station ages.

Delta Electricity has applied for a further 5-year exemption, which would allow it to continue to emit almost double the allowed nitrogen oxide level under the Clean Air Regulation until 2027.

Health experts, environmental organisations and community groups have urged and continue to urge the EPA to fulfill its duty to protect public health by rejecting the Vales Point exemption application.

3.1 Health impacts

Burning coal for electricity generation emits a broad range of pollutants that impact health. The Clean Air Bill addresses four key pollutants released or formed in the atmosphere from coal-fired power stations: fine particle pollution ($PM_{2.5}$) and coarse particle pollution (PM_{10}) (collectively, 'solid particles'), nitrogen oxides, sulphur dioxide and mercury.

A 2019 global review of evidence found that air pollution has the potential to damage every organ and every cell in the human body.[11] In 2018, the director general of the WHO declared air pollution a "public health emergency".[12] Children and older people are most vulnerable to the health impacts of air pollution.

Children are particularly vulnerable to $PM_{2.5}$ exposure due to the adverse effects on lung development. Reduced lung health and impaired development in children has lifelong consequences, including an increased risk of cardiovascular disease and associated mortality as an adult.[13],[14] Adverse neonatal outcomes, including preterm birth, low weight at birth and foetal growth restriction are associated with maternal exposures to nitrogen oxide and sulphur dioxide.[15]

In 2019, a group of scientists from NSW Office of Environment and Heritage led by Lisa Chang used an updated air pollution model to find that coal power stations are responsible for 17 percent of human-caused PM2.5 exposure in the Sydney GMR, or 6.8 percent of all PM2.5 exposure. Natural sources such as sea salt and dust were found to contribute 60percent.[16] Given that the total mortality from PM2.5 in the GMR is 1469, this suggests that coal power station PM2.5 is responsible for 100 deaths per year in the Sydney greater metropolitan region.

3.2 Health impacts on the Central Coast and Lake Macquarie

The highest concentrations of nitrogen oxide air pollution from coal-fired power stations occur in the air shed where the power station is located. Not only does the pollution travel far, but nitrogen oxide is also most concentrated at the source, disproportionally exposing people in nearby communities.

Vales Point coal power station is one of the two most urban power stations in NSW, so the health impacts of this coal power station are keenly felt by the people living in suburbs that surround the power station.

In 2018, Epidemiologist Dr Ben Ewald estimated that 279 deaths in the Sydney, Hunter Valley and Wollongong region are attributable to coal power station pollution. Pollution dispersion estimates were drawn from several sources, such as previous particle-characterisation studies, air pollution monitoring data, and meteorological back-tracing. Using these data points, Dr Ewald estimated that coal power stations are responsible for 16 percent of PM2.5 pollution exposure in the region.

650 children on the Central Coast and at Lake Macquarie have asthma directly attributable to nitrogen oxide emissions from coal-fired power stations.[17] This is approximately 5 percent of all local cases of childhood asthma. Just 20km north at the Eraring Power Station, low nitrogen oxide burners were fitted in 2012, and the station now emits nitrogen oxide at half the rate of Vales Point, effectively halving its contribution to asthma in local children.

The exemption provided to Vales Point to pollute over and above NSW limits is a major contributor to the number of children with asthma. The science does not support any safe level of exposure to air pollutants. There should be no exemptions to pollute over the legislated limits allowed for coal-fired power stations.

3.3 The costs of exemptions to emission limits

While the exact cost of the health burden from burning coal for electricity is subject to discussion, it is certainly in the billions of dollars. The industry has a history of claiming “no health impact”, simply because ambient air quality guidelines are met most of the time, although health science shows that this is plainly untrue and untenable.

To reach an estimate of health costs, health scientists perform several steps, and must make several estimates or assumptions. These include:

1. estimating the pollution load emitted and types of pollution included or omitted from the study,
2. modelling or estimating the way the pollution disperses,
3. estimating or averaging the population density and distribution who breathe in the pollution,
4. estimating the amount of disease caused from a given amount of pollution, based on epidemiological studies. This is often a contentious step, where recent evidence and studies are ignored due to uncertainty or a lack of verification, and
5. estimating the cost burden attributed to loss of life and other disease burdens.

There are various estimates of the heath costs of air pollution from coal fired power stations in Australia.

In 2020, using the health impacts figures from the Farrow et al 2020 Report, a team of volunteer actuaries estimated the health cost to the Australian economy from coal-fired power stations, based on an 845 low birth-weight births, 14,434 person-days of asthma symptoms for 5-19 year olds and 785 premature deaths attributable to nitrogen oxides, sulphur dioxide (NOx and SOx) and solid particle pollution from coal-fired power stations in 2019, to be $2.423 billion.[18] [19]

In 2017, Dr Richard Broome of NSW Health estimated that NSW coal power stations caused 40 premature deaths in the Sydney Greater Metropolitan Region (GMR) per year via fine particle pollution alone. That study estimated the benefit of fitting NOx and SOx controls that reduce PM2.5 at $2.3 billion.[20] Broome et. al focussed on PM2.5 because it is the main cause of disease from coal fired power station pollution, although not the only one. NOx and SOx controls also help to reduce PM2.5 pollution because these gasses go on to form particles in the atmosphere, known as secondary particle pollution.

Doctors for the Environment estimated that the total health burden from NSW coal fired power stations is $13 per MWh, or one cent per kilowatt-hour. They suggested that this would be matched by applying a load-based licensing pollution fee unit of $2,192.58 to the five big coal fired generators in NSW. This is 49 times the current fee, and total fees for the five big NSW coal fired generators would be $687 million per year.[21]

In 2016 US Scientists estimated a range of marginal social costs of US$3,800−14,000 per tonne NOx, and US$14,000−24,000 per tonne of SOx emitted by power stations.[22] There is not a comparable estimate for Australian power stations.

4. Comparison of NSW power stations with international best practice

Actual pollution from NSW power plants is unacceptable given the internationally available technology. The international comparison is shown for Bayswater power station in **Error! Reference source not found.**.

Table 4: Bayswater power station SO2 and NOX pollution compared to international best practice

Pollutant	Emissions intensity of Bayswater power station (kg/MWh)[23]	International best practice for coal-fired power stations (kg/MWh)[24]	Comparison
SO_2	4.47	0.06 – 0.08	Fifty-five times worse than best practice
NO_X	2.93	0.16 – 0.42	Seven times worse than best practice

Emissions limits set in NSW also compare unfavourably to overseas. A comparison of Mount Piper's emissions limits with Europe's emissions limits is shown in table 5:

Table 5: NSW Emissions limits compared with Europe

	Solid particles (mg/m^3)	Nitrogen oxides (mg/m^3)	Mercury (mg/m^3)	Sulfur dioxide (mg/m^3)
Mount Piper (Group 4)	50	1500	0.05	1700

European Union Industrial Emissions Directive for existing black coal plant[25]	8	200	0.004	205
Comparison* **	**Up to 6 times worse**	**Up to 7.5 times worse**	**Up to 12 times worse**	**Up to 8 times worse**

*** EU limits are daily average limits, while NSW limits are for maximum values, so comparisons are approximate and depend on fluctuations in pollution levels over a 24 hour period.

5. Cost of pollution control technology

Various forms of technology exist to reduce emissions from coal fired power stations, including:

- low nitrogen oxides (low NOx) burners that can reduce emissions by up to 50 percent
- wet or dry scrubbers, also known as flue gas desulfurisation (FGD), which can remove up to 99 percent of sulphur pollution and also remove mercury [26]
- selective catalytic or non-catalytic reduction methods (SCR and SNCR), which can reduce over 90 percent of nitrogen oxides from emissions[27]
- fabric bag filters, to reduce solid particle emissions.

Out of the above, only fabric filtration technology has been adopted in the majority of NSW coal-fired power stations. Eraring alone has low installed NOx burners.

Overall, the costs of installing FGD and SCR are falling globally.[28] Despite this, operators maintain that installing best practice controls is too costly. This argument was raised by Delta in its 2015 and current applications under the Clean Air Regulation for an exemption from the Group 5 nitrogen oxides emission limits.

Of course, operators will argue against being forced to internalise the costs of their own pollution. However, this technology is widely used overseas, and even in the case of low-NOx burners, right here in NSW, demonstrating that costs are manageable.

The NSW EPA has required Liddell and Vales Point power stations to assess the costs of fitting NOx pollution controls. These engineering consultants' reports are now available thanks to the Government Information (Public Access) Act 2009. The cost of fitting low-NOx burners at Vales Point is estimated at $33m in capital expenditure, with $25m in operating costs over 10 years.[29]

6. Efficacy of low NOx burners

In 2011-12 as part of a major upgrade, Eraring power station fitted low NOx burners, while the EPA tightened the plant's NOx emissions limit from 2500 mg/m3 to 1100 mg/m3.

Eraring operators, Origin Energy, state that low NOx burners have been very effective at reducing NOx pollution by around 40 percent.[30]

An analysis of 12 months of air monitoring data by NCC, as shown in Table 6 and Figure 1 reveals that:

- Eraring, with low NOx burners installed in 2012, emits NOx at approximately half the rate of other coal fired power stations in NSW.
- NOx emissions at the plant never exceeded 641 mg/m3, well below the 800 mg/m3 Group 5 limit, and rarely exceeded the 500 mg/m3 group 6 limit.
- Existing environment protection licence and Clean Air Regulation limits for coal fired power stations of 1100 – 2500 mg/m3 are completely ineffective at driving even modest pollution control technologies.

As demonstrated at Eraring, NOx emissions can be significantly and feasibly reduced, leaving no reason to extend the exemption to Group 5 emissions limits at other coal fired power stations.

Table 6: Summary of Nitrogen Oxide emissions at Eraring power station from September 2019 – August 2020

	12-month average NOx emissions (mg/m3)	**hourly maximum NOx emissions (mg/m3)**
Unit 1	296	476
Unit 2	299	599
Unit 3	332	599
Unit 4	400	641

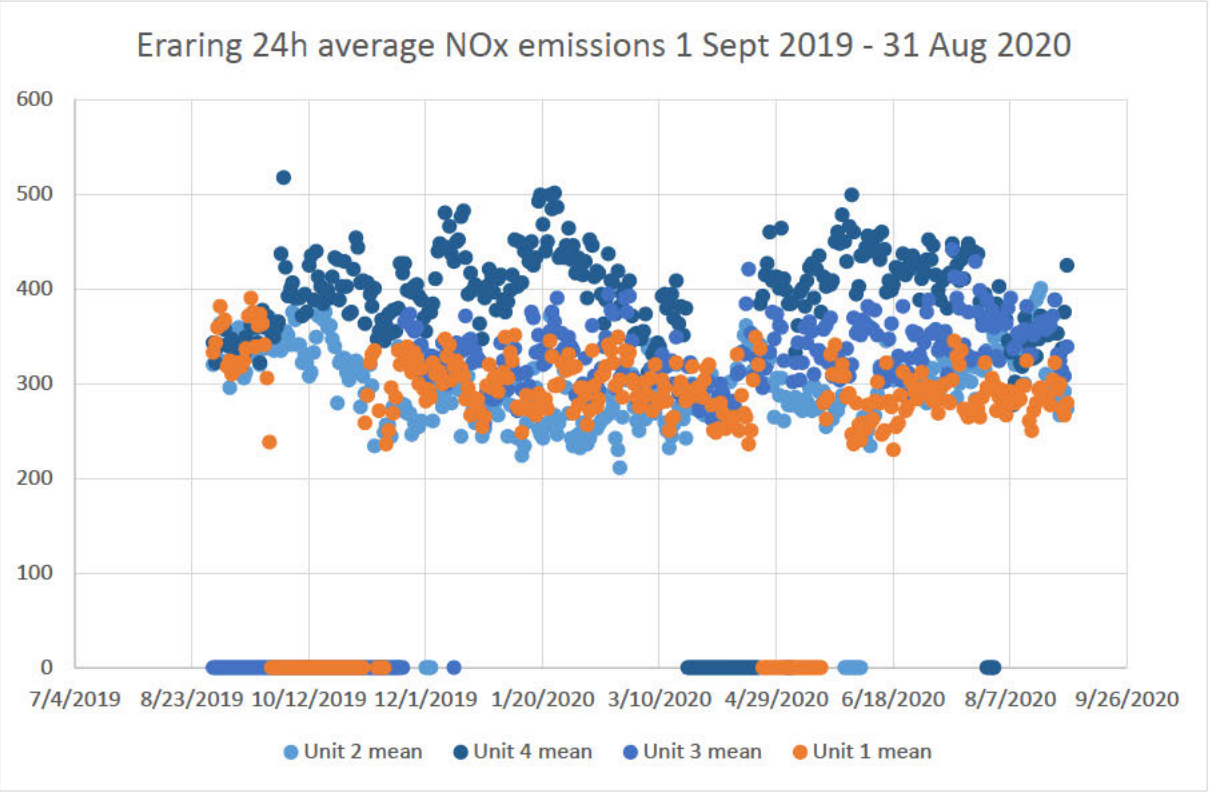

Figure 1: Eraring 24h average NOx emissions 1 Sept 2019 - 31 Aug 2020, based on Origin Energy monthly environmental reports.

Low NOx burners are a modest pollution control, and far more effective NOx removal can be achieved by combining these burners with post-combustion controls such as selective or non-selective catalytic reduction.

7. Standards proposed by the Clean Air Bill

The Clean Air Bill recognises that the fastest way to bring down ambient air pollution levels is to strictly regulate pollution at its source. The standards proposed in s128(1AA) of the Clean Air Bill are a significant improvement on the current standards in the Clean Air Regulation for nitrogen oxides and solid particles. The introduction of legislated standards for sulphur dioxide and mercury are also substantially lower than current emission limits set in individual environment protection licences.

If the Clean Air Bill is enacted, coal-fired power stations would have to install pollution control equipment to meet the proposed standards. This would lead to improved health outcomes for communities and a reduction of the estimated $ 1.4 billion annual health bill for NSW.

8. Commencement

If enacted, the Clean Air Bill "would commence on the date of assent". Whilst we support the swift introduction of tougher emissions standards to protect human health, we acknowledge that the installation of pollution controls in existing coal-fired power stations requires time for power stations to prepare, contract, construct and test controls, and where possible to align connection of air controls during schedule outages to minimise outages and to ensure consistent electricity supply.

We recommend that the Bill ensures that the EPA can negotiate with power station owners to set realistic timelines for compliance that balance the health impacts of delayed implementation with reasonably achievable deadlines for planning, installation, testing and commissioning of best practice pollution controls.

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