

**Submission
No 5**

**INQUIRY INTO COSTS FOR REMEDIATION OF SITES
CONTAINING COAL ASH REPOSITORIES**

Organisation: Beyond Zero Emissions

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Beyond Zero Emissions

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Dear Secretariat,

Re: Inquiry into the costs for remediation of sites containing coal ash repositories

I am writing to submit to the Inquiry into the costs for remediation of sites containing coal ash repositories. Beyond Zero Emissions welcomes the Committee's interest in answering the important question of how to safely manage millions of tonnes of toxic coal-ash over the long-term.

Minimising the costs associated with coal-ash management and site remediation

First and foremost, Beyond Zero Emissions is of the strong view that the first step to managing the problem posed by coal-ash is to stop producing additional ash as soon as possible. The managed closure of NSW's ageing fleet of coal power stations is the only way to halt the growth of coal-ash repositories. Beyond Zero Emissions first demonstrated the technical feasibility of managing a national energy system without coal generation in 2010, with our groundbreaking *Stationary Energy Plan*.¹ These findings have since been confirmed by experts at the Australian National University (ANU), Australian Energy Market Operator (AEMO) and the Commonwealth Scientific and Industrial Research Organisation (CSIRO).^{2 3 4}

Our view is that Australia's economic, social and environmental interests are best served by a rapid transition to a grid powered by 100% renewable electricity. This transition would contribute to global efforts to secure a safe climate, and position Australia as a renewable energy superpower in a carbon-constrained world. In the absence of Commonwealth policy direction, the NSW Government has an opportunity and a responsibility to lead this process to ensure a smooth, least cost energy transition.

Economic benefits of using fly-ash to make zero and low carbon cement

There is potential for Australia to use stockpiled coal-ash to manufacture zero and low carbon cements. Using coal-ash in this way can grow a new industry in coal regions, allow for the ongoing management and remediation of coal-ash repositories, and position Australia as a leader in decarbonising our built environment.

¹ Zero Carbon Australia: Stationary Energy Plan. Beyond Zero Emissions. 2010.

² "100% Renewable Energy." RE100. The Australian National University, re100.eng.anu.edu.au/research/re/.

³ *100% Renewables Study – Modelling Outcomes*. Australian Energy Market Operator, 2013.

⁴ *Electricity Network Transformation Roadmap*. Energy Networks Australia & The Commonwealth Scientific and Industrial Research Organisation, 2017.

In 2017 Beyond Zero Emissions released *Rethinking Cement* - a ten year plan for decarbonising the Australian cement industry.⁵ Our report sets out how Australia can become a global leader in the production and use of alternative cements, including those made entirely, or in large part, using coal-ash. For context, 8% of all global greenhouse gas emissions are from manufacturing cement, a number projected to increase to 26% by 2050 if no action is taken to transition to a zero-carbon cement industry (as a result of decarbonisation in other sectors).

Our report includes two strategies that make use of fly-ash from coal-fired power stations:

1. Using geopolymers cements that contain no Portland cement; and
2. Using high-blend cements with a low volume of Portland cement.

Our strategy assumes that in the short-term (up until 2025) fresh fly-ash will be used to manufacture low-carbon cements. In the longer term, following the closure of coal-fired power stations in Australia, we assume that the cement industry will move to use stockpiled fly-ash.

Australia has huge stockpiles of fly-ash. In *Rethinking Cement* we conservatively assumed that only 25% of all stockpiled fly-ash will be suitable for manufacturing cement. NSW's five coal power stations make up 42% of Australia's coal generating capacity; given the age of the plants and relatively high ash content of Hunter Valley thermal coal, it is likely the state is home to more than half of the 225 to 500 million tonnes of coal-ash stockpiled nationwide.^{6 7 8 9} Assuming 25% of this 113 to 250 million tonnes is suitable for cement production, there is between 28 to 63 million tonnes of useable coal-ash in NSW. Given the technical feasibility of producing geopolymer cement products of up to 95% coal-ash, the NSW stockpile could supply a plant the size of Boral's 1.4 mtpa Berrima facility for up to 45 years.

While stockpiled fly-ash is not currently used in cement production in Australia, the US, the UK and other parts of Europe are currently moving to use stockpiled fly-ash to manufacture low carbon cements. The Australian market can replicate this international movement and begin to use stock-piled fly-ash productively in low and zero carbon cement.

Our detailed analysis of the use of fly-ash in cement can be found in *Rethinking Cement*. We are happy to provide any follow-up advice on the use of coal-ash in cement the Committee may require in preparing the Inquiry's final report.

⁵ Zero Carbon Industry Plan: *Rethinking Cement*. Beyond Zero Emissions, 2017

⁶ OpenNEM. opennem.org.au/facilities/all/.

⁷ *Quality of Coal Deposits in New South Wales*. NSW Department of Industry, Skills and Regional Development, 2016.

⁸ *Hazardous Waste in Australia 2017*. Department of the Environment and Energy, 2017.

⁹ *Rehabilitation of Mining and Resources Projects and Power Station Ash Dams as It Relates to Commonwealth Responsibilities: Final Report*. Senate Standing Committees on Environment and Communications, 2019.

Impact of coal-fired power stations on human and environmental health

The Inquiry's terms of reference refer to the health and environmental impacts of coal-ash repositories. Beyond Zero Emissions' acknowledges and highlights the work of Environmental Justice Australia (EJA) in advocating for strong regulation that protects communities from the harms of coal-ash. We refer the Committee to EJA's 2017 report, *Toxic and Terminal* and their 2019 report, *Unearthing Australia's Toxic Coal Ash Legacy*.^{10 11}

Beyond Zero Emissions also commends the ongoing work of the Hunter Community Environment Centre (HCEC) to monitor and report on the impacts of heavy metals in coal-ash leaching into Lake Macquarie. Were it not for the work of the HCEC, communities around Lake Macquarie would likely still be unaware of the harmful impacts of ash repositories on their local environment.¹²

The existence of huge quantities of ash at every power station in Australia poses additional ongoing risks to human and environmental health beyond groundwater leaching. Northern Power Station in Port Augusta provides an important lesson in the importance of rigorous ongoing management of coal-ash repositories. In 2017 the clay seals on the shuttered plant's ash dams broke up during hot weather. Subsequent windy weather blew fine ash dust over the town of Port Augusta, causing distress and ill-health in the community.

Another risk is that an ash pond floods, releasing fly ash into the environment. In 2008, a coal ash pond in the US state of Tennessee collapsed after prolonged heavy rain, spilling 4.3 million cubic meters of ash into the surrounding countryside and contaminating nearby waterways. Given the proximity of NSW's large ash repositories to heavily populated areas and marine ecosystems, the current permissive regulatory regimen poses an unacceptable ongoing risk to human and environmental health.

Finding uses for stockpiled coal-ash - such as low-carbon cement - can alleviate these environmental and public health issues.

Recommendations

The Inquiry should recommend that the NSW State Government:

1. Avoid the creation of millions of additional tonnes of coal-ash by rapidly reducing NSW's reliance on coal-fired electricity generation.

¹⁰ *Toxic and Terminal: How the Regulation of Coal-Fired Power Stations Fails Australian Communities*. Environmental Justice Australia, 2017.

¹¹ *Unearthing Australia's Toxic Coal Ash Legacy*. Environmental Justice Australia, 2019.

¹² *Out of the Ashes: Water Pollution and Lake Macquarie's Ageing Coal-Fired Power Stations*. Hunter Community Environment Centre, 2019.

2. Investigate and recommend pathways for establishing a productive market for stockpiled coal-ash, for use in the manufacture of zero and low carbon cement.
 - 2.1. To facilitate this development, the NSW Government should fund a program to test ash stockpiles for their suitability in cement (similar to a program led by the UK Quality Ash Association).¹³
 - 2.2. The NSW Government should also work with industry and Government stakeholders to ensure Australian Standards (specifically AS 3972) explicitly recognise the role of geopolymers in construction via a Standard Specification.
 - 2.3. The NSW Government should also investigate options to grow onshore demand for low or zero carbon cements, including using State and Local Government procurement and requiring the use of sustainability rating tools for large construction projects (such as those developed by the Green Building Council and the Infrastructure Sustainability Council).
3. To avoid repeating the mistakes of the past, a robust regulatory environment is needed to ensure the mining, transport and use of stockpiled coal-ash is done in a way that protects the health of workers, the public, and the environment throughout manufacture and use.
4. Finally, the NSW Government should lobby the Commonwealth Government to increase funding available to low and zero-carbon cement research and development via Commonwealth organisations such as the CSIRO and the Clean Energy Finance Corporation (CEFC).

About Beyond Zero Emissions

Beyond Zero Emissions is an award winning, volunteer-led climate solutions think tank. We show that a zero emissions Australia is achievable and affordable today.

Yours Sincerely,

Vanessa Petrie
Chief Executive Officer
Beyond Zero Emissions

¹³ UK Quality Ash Association. www.ukqaa.org.uk/information.