

INQUIRY INTO EMISSIONS FROM THE FOSSIL FUEL SECTOR

Organisation: Centennial Coal
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NSW Parliamentary Inquiry into Fossil Fuel Emissions

Centennial Submission – August 2025

We appreciate the opportunity to make a submission to the NSW Parliamentary Inquiry into Fossil Fuel Emissions. We value the engagement on this matter and an opportunity to detail the key role that Centennial and coal mining play in the NSW economy and to the energy needs of the state.

(a) the relevance and consequences of fossil fuel greenhouse gas emissions for achieving New South Wales emissions reductions targets and complying with the guiding principles and purposes of the Climate Change (Net Zero Future) Act 2023

Centennial is a producer of low sulphur thermal coal that is central to the energy needs of New South Wales. We are one of the State's largest suppliers of thermal coal to the domestic electricity sector and have been operating for more than thirty-five years. Over this period, we have become a major employer in regional communities, with thousands of people working directly for Centennial and many more supported through contractors, suppliers, and local businesses. Our mines are located in the Lithgow and Lake Macquarie areas, close to the power stations that rely on our product to provide secure electricity supply.

Domestically, Centennial provides a dependable fuel source for power stations such as Mt Piper, Eraring, and Vales Point. These facilities continue to play a central role in meeting the State's electricity demand. Through our supply contracts, households and businesses have access to reliable and affordable power, particularly during periods when renewable generation cannot fully meet demand. This role is essential to maintaining system stability and reducing the risk of supply shortfalls or price shocks.

Our contribution is not limited to energy supply. Centennial's operations provide stable employment, strengthen regional economies and contribute royalties and taxes that flow back into public services for the people of New South Wales. In this way, Centennial supports both energy security and regional prosperity while the transition to a lower emissions economy gathers pace.

We recognise that coal can be an emissions-intensive commodity and that New South Wales is moving towards a net zero future. Centennial is investing in initiatives that reduce the impact of our operations, such as mine gas capture and electricity generation from waste coal mine gas. These projects demonstrate that coal can continue to meet current energy needs while its environmental footprint is progressively reduced, consistent with the State's longer-term transition goals.

Centennial acknowledges that fossil fuel related greenhouse gas emissions are a consideration for achieving the emissions reduction targets set under the Climate Change (Net Zero Future) Act 2023. We believe that it is important however to place our role in a broader context that considers the technical, economic, and social realities of the transition.

Coal continues to underpin New South Wales's energy security and to provide vital employment and regional income. The Act itself recognises the importance of transition with actions that are "fiscally responsible" and "promote(s) sustainable economic growth". This requires balancing emissions reduction with the need to maintain reliable power, protect jobs, and sustain regional communities.

Centennial has consistently invested in emissions management at our methane producing mines through projects such as mine sealing, gas drainage, flaring, and electricity generation from mine gas. We have in our past trialled technologies such as the VAM-RAB project at Mandalong Mine. At the same time, emerging abatement technologies, such as VAM-RTO, remain technically complex, costly, and not yet commercially scalable. Aiming for universal deployment of methane abatement technologies without accounting for the complexity of each site is not consistent with the intent of the Act and is not in line with international best practice.

Centennial have been engaged in real, measurable reductions of both direct and indirect emissions. Since financial year 2022 we have achieved a reduction of 51% of our Scope 1 emissions and a 17% reduction of Scope 2 emissions at our sites. The progression and operation of the Mandalong Power Station, in partnership with EDL, is one of the key examples of meaningful emissions reduction that we are undertaking at our sites.

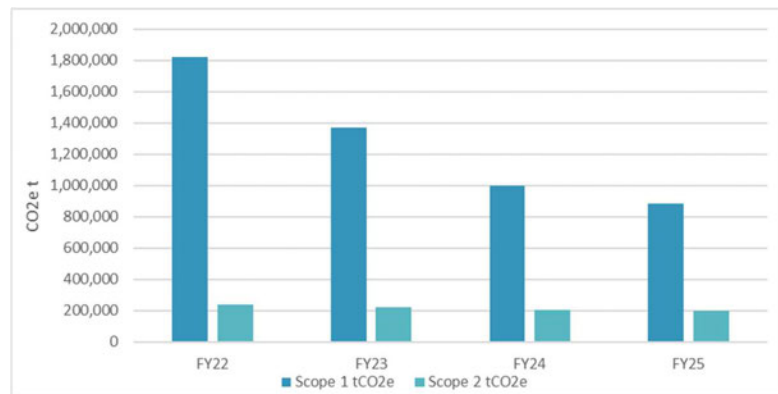


Figure 1 - Scope 1 and 2 Emissions Centennial

Centennial remains committed to working with government and industry partners to progress the State's transition. Our objective is to ensure that emissions reduction is achieved in a way that is technically feasible, economically responsible, and fair for the communities that depend on the coal industry today.

(b) quantification and measurement of coal-mine and gas industry methane and related greenhouse gas emissions in New South Wales including fugitive emissions, in particular:

(i) the accuracy of emissions reporting from coal mines and gas fields

Centennial facilities, like all underground coal mines in New South Wales, use a direct measurement approach known as Method 4 to estimate fugitive emissions from coal extraction. This method is the highest order recognised under the National Greenhouse and Energy Reporting (NGER) framework. It requires direct measurement of airflow and gas concentrations in mine ventilation systems to calculate the total volume of fugitive emissions released.

In addition, Centennial's emissions, energy use and production data are independently audited every six months by teams that include registered Category 1 and 2 NGER auditors. Because we are already applying the strictest measurement and reporting requirements set out in Australian legislation, and are subject to frequent external audits, Centennial is confident that our reporting is both stringent and accurate.

(ii) the relevance of using a twenty-year versus one-hundred-year global warming potential to assess short term climate impact

Australia is a signatory to international agreements such as the UNFCCC, the Paris Agreement and the Kyoto Protocol, which require the nation to accurately report its emissions, policies and progress towards climate targets. These reports are prepared under UNFCCC guidelines and are reviewed by independent international experts to ensure the integrity of Australia's data.

Greenhouse gases are compared using Global Warming Potentials (GWPs), which measure their impact against carbon dioxide. Methane's GWP depends on the timeframe used, but the international standard has long been a 100-year period. This approach provides consistency across countries and gases, allowing meaningful comparison and tracking of progress.

The Intergovernmental Panel on Climate Change (IPCC) periodically updates GWP values to reflect the best available science. Australia adopts these updated values in line with UNFCCC processes, providing industry with sufficient notice to adjust. This ensures Australia's reporting remains both scientifically robust and internationally consistent.

For Centennial, this framework provides clarity and stability in how emissions are measured and reported. By following Australia's legislated requirements, which are based on international standards and regularly reviewed by technical experts, Centennial can be confident that our reporting is both accurate and aligned with global best practice.

(iii) *current measurement, reporting and verification methods and whether they reflect best practice*

Some organisations have, in the past few years, suggested that National Greenhouse and Energy Reporting (NGERs) methods are inaccurate, relying instead on results from experimental "top-down" studies such as satellite or remote sensing. Centennial believes these claims are misleading. While such technologies may hold promise, they are not yet accepted by the IPCC or NGERs as reliable methods for measuring coal mine emissions inventories.

Methane detection from satellites is not the same as creating a full emissions inventory. Converting limited atmospheric readings into accurate emissions estimates involves many uncertainties, including sensor interference, defining emission plumes, and modelling gas dispersion based on wind speed and direction. These challenges, combined with the variability of emissions over time, mean that satellite results cannot yet provide the accuracy needed at the facility level. In addition to the issues the current imaging technology that is available has, at best, an ability to pick up emissions from a 25m² area. At one of our largest facilities this would not be accurate enough to differentiate the source of emissions as originating from our site or from a neighbouring installation. The Clean Energy Regulator has itself confirmed that these methods are not currently reliable for site-specific reporting.

Centennial supports innovation and is actively involved in research into new monitoring approaches through the industry's research body, ACARP. We also note that the Commonwealth Government has established an expert panel to assess the scientific evidence around top-down methods and their possible role in strengthening NGERs in the future.

Until that work is complete, the use of NGERs-approved methods remains the most rigorous and fit-for-purpose approach to emissions reporting. Centennial believes it is important that any new technologies are assessed through a careful, science-based process before being considered suitable for official reporting.

(c) *the transparency, timeliness and integrity of New South Wales' emission modelling and how this modelling is used to inform New South Wales' planning decisions*

Centennial recognises that the NSW Net Zero Model is an influential tool for assessing progress against the State's emissions reduction targets and informing policy development.

However, the model has inherent uncertainties due to the wide range of sectors and emission sources it covers. This is reflected in the regular revisions of both historical and projected emissions across industries. In addition, the model does not capture net emissions at the sector level, meaning the regulatory obligations and actual contributions of individual industries are not fully represented.

For the coal mining sector, this limitation can result in overestimation of emissions. Policymakers may therefore be relying on forecasts that are higher than the sector's likely gross and net emissions. Centennial believes it is important that these limitations are understood to ensure policy settings are informed by accurate and balanced data.

The NSW Mineral Council and Centennial have identified significant concerns regarding the accuracy of emissions projections used in the NSW Net Zero Model. The 2023–24 forecasts overestimated emissions from the coal sector by more than 3 million tonnes of CO₂e (when compared with verified emissions reported to the Clean Energy Regulator). Specifically, our review of data provided by the Net Zero team indicates that emissions from Centennial's operations were overstated by at least 994,141 tonnes CO₂e, almost double the actual reported emissions for that year. In addition, the model did not fully account for emissions reductions achieved through the surrender of Australian Carbon Credit Units (ACCUs) and Safeguard Mechanism Credits (SMCs). This represented a further ~180,000t CO₂e in offsets.

Given the level of inaccuracy for this sample year and for a single company, these findings raise questions about the modelling for future years and for other companies within the sector. Centennial believes that robust and accurate modelling is essential to ensure that future policy decisions are evidence-based and appropriately targeted.

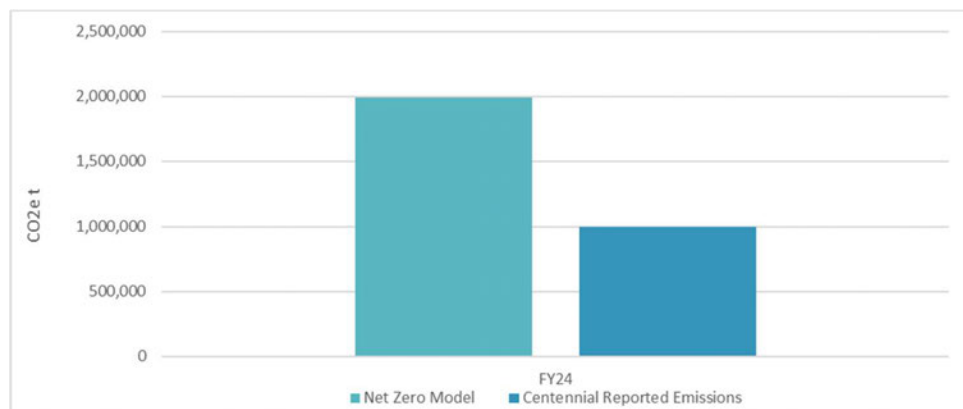


Figure 2 - FY24 Net Zero Model Emissions vs Actual

(d) the implementation and feasibility of greenhouse gas abatement, including ventilation air methane (VAM) abatement for coal mining

Underground coal mines circulate large volumes of fresh air to maintain safe working conditions. NSW regulations require mines to reduce methane concentrations as low as reasonably practicable with legislated limits of 2% in return airways (the lower explosive limit of methane is 5% by volume). The air released from underground mines contains very low concentrations of methane, known as Ventilation Air Methane (VAM). Centennial designs its mines and ventilation systems to keep this as low as reasonably practicable, typically less than 0.25%.

Abating VAM is technically challenging due to both its low concentration and the volume of air. Currently, the only available technology is Regenerative Thermal Oxidation (RTO). These units, which abate 25m³/s per unit, are roughly the size of a shipping container and use a ceramic bed heated to around 1000°C, initially using an external energy source (usually gas or electricity). Air is drawn from the mine ventilation system into the VAM-RTO unit, where the heat oxidises methane into carbon dioxide and water. The aim of the VAM unit is to reach self-sustaining operation without additional external fuel, though power is still required for the unit to operate fans, valves, monitoring, and other supporting equipment.

There are several significant challenges in implementing VAM abatement at scale:

Safety: Attaching an RTO which destroys methane at 1000°C to a mine's ventilation system introduces a potential ignition source. The ignition temperature of methane is around 537°C. There is a risk that a concentrated "plug" of methane could enter the unit and trigger an explosion. This is a risk that cannot be understated when talking about VAM. Centennial trialled an early iteration of a VAM plant at our Mandalong Operation over a decade ago (VAM-RAB Corky's Project). This plant experienced a number of failures with the most notable being it reportedly caught fire on at least one occasion. The plant was decommissioned soon after due to the serious safety risk to our people.

Operational limits: VAM-RTOs need a minimum methane concentration to operate efficiently. If concentrations fall too low, supplementary gas is required, which increases both costs and emissions. CSIRO has highlighted uncertainty in operating RTOs with VAM at 0.2%–0.4%. This is the range that the mines that Centennial operate that have gas sit at. Globally, RTOs have only operated reliably at higher than 0.4% and typically only treat a small portion of the ventilation air.

Infrastructure footprint: The ventilation shafts at Centennial mines with gas emit between 350–480 m³/second of air. A standard RTO unit can take around 25 m³/second. Fully treating a mine's airflow would require multiple RTO units, creating a large physical footprint. Site constraints such as biodiversity, noise, water access, and land tenure add complexity, and regulatory approvals can be lengthy and uncertain, potentially adding significant costs.

Costs: Large-scale VAM abatement projects can cost hundreds of millions of dollars, not including the costs for approvals and civil works. Viability varies depending on mine-specific factors, including ventilation air methane concentrations, mine layout, remaining mine life, surface constraints, and ongoing uncertainty in a constantly changing political landscape.

RTO projects do exist in overseas mines (i.e. Buchan County in Virginia USA, China), their technical setups, safety/regulatory standards, and commercial contexts vastly differ from NSW operations and are in no way directly transferable. These projects aim to concentrate methane in their ventilation system, typically above 0.8%, in a way that Australian safety standards and best practice do not allow for. They also only treat a small portion of the air emitting from the mine. Aiming to replicate this example in Australia is not technically, or operationally possible.

The industry is also exploring catalytic VAM abatement technologies, which could operate at lower methane concentrations and temperatures and require smaller infrastructure, potentially expanding adoption. Centennial has been in contact with the group behind this technology and is broadly supportive of its goals. However, these technologies are still in development and are not expected to be commercially available at scale until the 2030s.

(e) *economic costs associated with greenhouse gas emissions including indirect costs from climate change related impacts and opportunity costs for other sectors, and*

Centennial plays a critical role in supporting NSW's energy security and regional economies during the State's complex and costly transition to renewable energy. By continuing to provide a reliable and affordable source of fuel for electricity generation, we help stabilise the energy market at a time when rising infrastructure costs, supply chain constraints, and project delays in the renewable sector are driving increased electricity prices for households and businesses.

Our operations also deliver continued, meaningful employment for our workforce, many of whom live in regional communities that rely heavily on the coal industry. These employees are proud to contribute to the secure supply of energy that underpins the State's economy and to support the safe, responsible, and compliant management of our operations.

By maintaining this reliable base-load energy supply while NSW expands its renewable capacity, Centennial is helping to smooth the transition, ensuring that energy remains affordable and secure, while sustaining the livelihoods and economic stability of the communities in which we operate.