

NSWEPA ventilation air methane abatement at NSW coal mines: 1 October 2025, Sydney Australia

Workshop attendees

Facilitator: - Steve Rossiter, ATX Consulting NSW EPA: - Asela Atapattu, Executive Director Strategy and Policy - Shagofta Ali, Director Strategy and Policy - Kay Baxter, Manager Policy - Amanda Allan, Unit Head Policy - Jenny Haining, Senior Policy Officer Other NSW Government agencies or independent bodies: - Deborah Kidman, Director Strategy & Performance, Department of Primary Industries & Regional Development (DPIRD) - Shane Pegg, Principal Inspector (Mining & Competency), Resources Regulator, DPIRD - Ruby Kan, Principal Advisor, Net Zero Commission Technical Note Taker: - Daniel Sepulveda, Palaris	Suppliers: - Andrew Yu, Baolan - Lui Jun, Baolan - Alan Shen, Ever-Power Group - Edison Gan, Ever-Power Group - Zhe Chen, Yurcent Environmental Technology Co. - Kevin Jones, Dürr - Brian Jones, Air Filtration Systems - Richard Jones, Gasco - Ross Campbell, HOMAG Australia - Claude Mocellin, Peak Carbon Capital - Chris Mapleson, Hazardproof (on behalf of Biothermica) - Jose Miguel Gonzalez, TECAM - Rich Grzanka, Anguil - Troy McDonald, PPM - Yonggang Jin, CSIRO Mining sector representatives: - David Frith, NSW Minerals Council - Damian Dwyer, Low Emissions Technology Australia - Kathryn Ryan, Centennial Coal - Sandy Tickell, Glencore - Frank Fulham, Yancoal - Richard Van Laeren, Yancoal - Lynden Cini, Whitehaven Coal - Russell Thomas, GM³ - Gabrielle Foodey, GM³ - Damian Wichlacz, Peabody Energy - Tim McNeice, Simec - Dominic Brown, Malabar Resources
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Context

On 1 October 2025, the EPA convened a technical workshop on ventilation air methane abatement for underground coal mines. This was to inform its *Proposed Greenhouse Gas Mitigation Guide for NSW Coal Mines* (coal guide) and related regulatory settings.

The workshop brought together representatives from NSW's largest ventilation air methane emitting underground coal mine facilities, technical specialists (ventilation engineering, process safety, controls), and equipment suppliers – alongside NSW agencies.

The EPA's proposed coal guide is the first of many sector guides intended to drive and support onsite abatement. It contains the following proposed requirement for the destruction of ventilation air methane at underground coal mines.

Mitigation objective	Proposed EPA requirement and expected start	Criteria
Destroy ventilation air methane at underground mines Examples: • Regenerative thermal oxidation • Regenerative catalytic oxidation • Ventilation air methane enrichment	By July 2030: ventilation air methane abatement is installed on all mine shafts. In 2028, the EPA will review whether the safety issues for ventilation air methane regenerative thermal oxidation have been resolved before implementing mandatory requirements.	Underground mines that: • will be in an active (operational) mining phase beyond July 2032, and • emit (or are likely to emit) >100,000 t CO₂-e/year (scope 1).

The purpose of the workshop was to discuss the proposed requirements for ventilation air methane abatement with a focus on key technical feasibility elements, safety, and implementation timelines in the NSW coal mining context.

This document was circulated to participants for review before being published on the EPA's website.

Information provided by ventilation air methane suppliers before the workshop and the slides from the workshop are attached to these notes as appendices.

Key points

- Coal mine operators advised there is significant interest in ventilation air methane abatement in the NSW mining industry and the safeguard mechanism is driving the industry to investigate how to overcome current barriers.
- Most NSW mine attendees indicated that they would be unable to justify progressing with commercial scale ventilation air methane abatement until it is proven in a NSW context given the financial, technical and safety risks associated with these projects. This included performance data, destruction efficiency, self-sustain boundary conditions, safety systems, operations and maintenance, and lifetime cost.

Technical feasibility

- Ventilation air methane abatement with self-sustaining regenerative thermal oxidiser modules is technically feasible down to about 0.2% ventilation air methane concentration. Suppliers of regenerative thermal oxidiser systems indicated they will guarantee down to this concentration.
- A ventilation air methane regenerative thermal oxidiser trial at a low ventilation air methane concentration coal mine in Wales is expected to provide results in late 2026. A ventilation air methane regenerative thermal oxidiser trial in NSW is planned for commissioning in October 2026, subject to approvals. Lessons and data should be available from early 2028.
- Several NSW underground mines are below 0.2% ventilation air methane. Ventilation air methane regenerative thermal oxidiser can technically operate below 0.2% methane concentration, but it introduces extra risk and cost as more energy sources are needed to sustain the operation. Regenerative catalytic oxidation technology may provide an opportunity for ventilation air methane abatement at mines with less than 0.2% ventilation air methane concentration. An industry research body advised this technology could be ready to test at scale in the 2030s.
- Site-specific factors that influence regenerative thermal oxidiser system design include physical space constraints, gas composition, dust loading, and ventilation air methane concentration variability. Studies to determine these site-specific characteristics are important to inform a site's regenerative thermal oxidiser system design.

Safety

- A ventilation air methane oxidiser is inherently an ignition source. If installed on a site, the safety hazard cannot be eliminated. Risk must therefore be reduced through engineered controls and safety instrumented functions, supported by administrative controls and verification processes.
- Ventilation air methane abatement projects are not currently designated a “high-risk activity” under NSW mining legislation. If ventilation air methane abatement projects are broadly deployed across NSW, the Resources Regulator is likely to advise to Government to amend legislation to classify ventilation air methane abatement as a high-risk activity, introducing explicit notification and extra regulatory requirements.

- The NSW Resources Regulator indicated that formalised safety guidance can be developed once credible trial evidence is available. Formalised guidance may take the form of a high risk activity notification process and the publication of other guidance material.
- Suppliers noted that safety issues such as methane spikes, ignition risk at surface, hazardous-area compliance, reaction times, etc. have commercially available engineering solutions that have been proven in various hazardous, non-coal mine contexts.
- Detection and isolation systems must act before explosive mixtures reach ignition sources. Trials are underway that will help to standardise sensor and valve specifications in a coal mining context.

Physical and planning constraints

- Large NSW shafts (600–700 m³/s) may require 30+ regenerative thermal oxidiser modules, extensive ducting, and isolation systems. No current examples exist at this scale.
- For projects of this scale, land clearing and noise suppression will be important planning considerations, especially near residential areas. Cumulative impacts (e.g. air, noise and amenity) must also be considered.
- One supplier cited a rule of thumb of about 5 MW per 200 m³/s treated. Grid augmentation may be required, increasing Scope-2 emissions and project time and costs.
- The planning approval process for installing ventilation air methane abatement is significant for mine operators, adding risk to abatement projects in terms of cost and time to implementation. Mines noted that seeking a modification to install ventilation air methane abatement units could open up other parts of their consent, creating extra uncertainty for their business.
- Mine operators noted that it is difficult to get approval for longer-term modifications or consents. However, long-term consent approvals could derisk some of the financial decisions associated with large capital expenditure. Boards consider a range of investment metrics (such as net present value, payback, cost of carbon) for investments against remaining development consent timelines, even if the theoretical mine life is longer than the development consent.

Timeframes

- Suppliers noted that a common pathway is to go from one regenerative thermal oxidiser unit to a small bank (e.g. four units), followed by staged replication to validate interfaces and controls before building out to commercial scale.
- A NSW mine is exploring a direct move to full commercial deployment of ventilation air methane regenerative thermal oxidiser, bypassing a separate trial phase due to capital and time constraints. Current estimated timelines (dependent on financing) are:
- 12 months for consent modification

- Commission the first unit within about 2.5 years, followed by sequential commissioning of the remaining 18 units.
- Potential schedule risks include noise approvals, stack/tower impacts, modification consents, space constraints, and high-voltage grid augmentation.

This mine suggested that ventilation air methane regenerative thermal oxidiser units could have a two year payback in terms of operating cost reduction due to reduced safeguard liabilities (note this is not a revenue-based payback, it is a reduction in liability expenses).