



Peak
Carbon

Ventilation Air Methane (VAM)

Reducing Emissions at Underground
Mines



Technology Types

Regenerative Thermal Oxidiser (RTO)

- Project Experience in the range 0.2% to 1.2% CH₄
- Technically possible to perhaps 0.15% CH₄
- Units should be sized appropriate to concentration resource
- Flow rates over 1,000,000m³/hr through modular approach
- In use on coal mines since 1994
- Technology mature since 1971
- **Deployable today**

Catalytic Oxidation (CRTO or RCO)

- Mature Technology
- Application to VAM challenges associated with cost and poisoning of catalytic media
- Benefit over RTO is associated with fan pressure drop – lower electricity cost
- Safety benefit associated with lower ignition temperature not valid at the c.450 degrees C temp range
- **3 years away from scale deployment**

R&D

- Catalysts
- Concentration
- Safety
- Bed Design
- Costs
- Etc
- **3 to 10 years plus away from deployment**

VAM Abatement Mitigation Opportunities

Europe – Mainly Poland, regulation in progress

USA – Voluntary market only sufficient to finance high concentration projects

China – Huge opportunity, unclear regulatory or finance path

India – Mainly surface mining, VAM resource unclear

Russia – Regulation path and finance path unclear

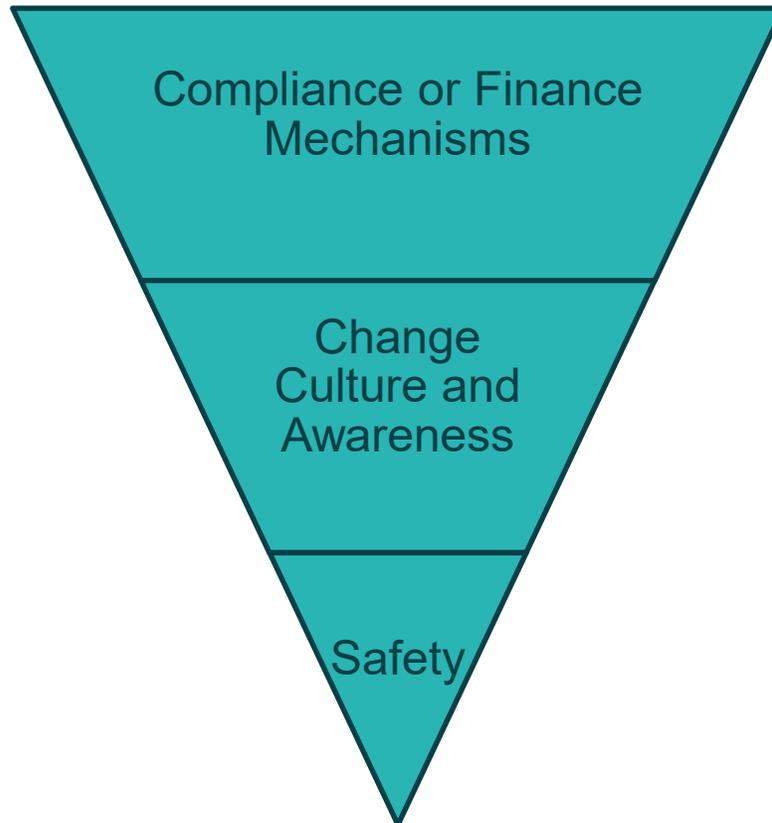
Australia – Large opportunity, regulatory landscape for mitigation difficult

Indonesia – Mainly surface mining, VAM resource unclear

Kazakhstan – Medium opportunity, regulatory path unclear, voluntary markets?

Colombia – Unknown

VAM Abatement Barriers to Deployment



Either Government force mines to make the polluter pay, or private finance develops mechanism to incentivise development sufficiently

Coal mines business is coal, adding a new environmental element to their business is difficult, and adaptation is required

RTO providers and developers have a challenge in meeting local regulatory requirements, and in communicating appropriate safety processes effectively to mines and regulators

CSIRO R&D Projects

- Characterisation and Cleaning of Mine Ventilation Air Flows
- A Feasibility Study on Mitigating and Utilising Diluted Mine Methane by Using a Monolithic Catalytic Combustor at Tiefa
- Demonstration of GHG Reduction from Mine Ventilation Air in China (VAMCAT Huainan Trial)
- Novel Cost-Effective Ventilation Air Methane Mitigator
- Optimisation of a Thermal Flow Reversal Reactor for Ventilation Air Methane Mitigation
- Carbon Fibre Composites for Ventilation Air Methane Capture
- VAM Enrichment with a Two-stage Adsorption Process
- Development of New Generation Carbon Composites for VAM Capture
- Flame Arresting Mechanisms and Flameproof Device for VAM Mitigation
- Proof-of-Concept Photocatalytic Destruction of Methane for Coal Mining Fugitive Emissions Abatement
- Low-Cost Catalyst Materials for Effective VAM Catalytic Oxidation
- Progress in Developing Ventilation Air Methane Abatement Technologies
- International Effort on Coal Mine Fugitive Methane Emissions Abatement
- Site Trials of a Suite of Novel VAM Technologies
- Development and Site Trials of a Novel Pilot Ventilation Air Methane Catalytic Mitigator
- Site Trials and Demonstration of a Full Scale VAMMIT Unit



Thank You – Neil Butler

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