Methane Monday - what is actually being done by the industry

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COAL TO CLEAN ENERGY POLICY

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Accelerating the global electricity transition from coal to clean

Tracking electricity data

Changing policy

Shaping the global narrative

Empowering campaigns

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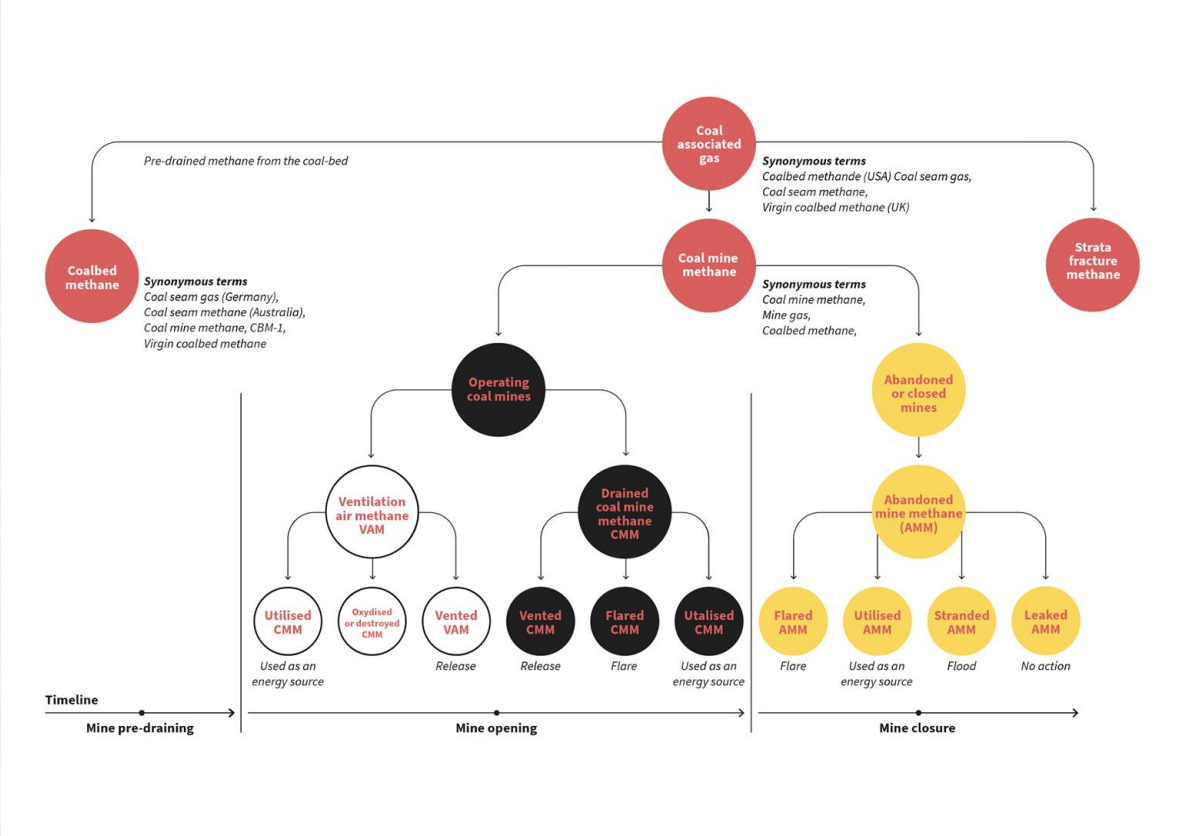
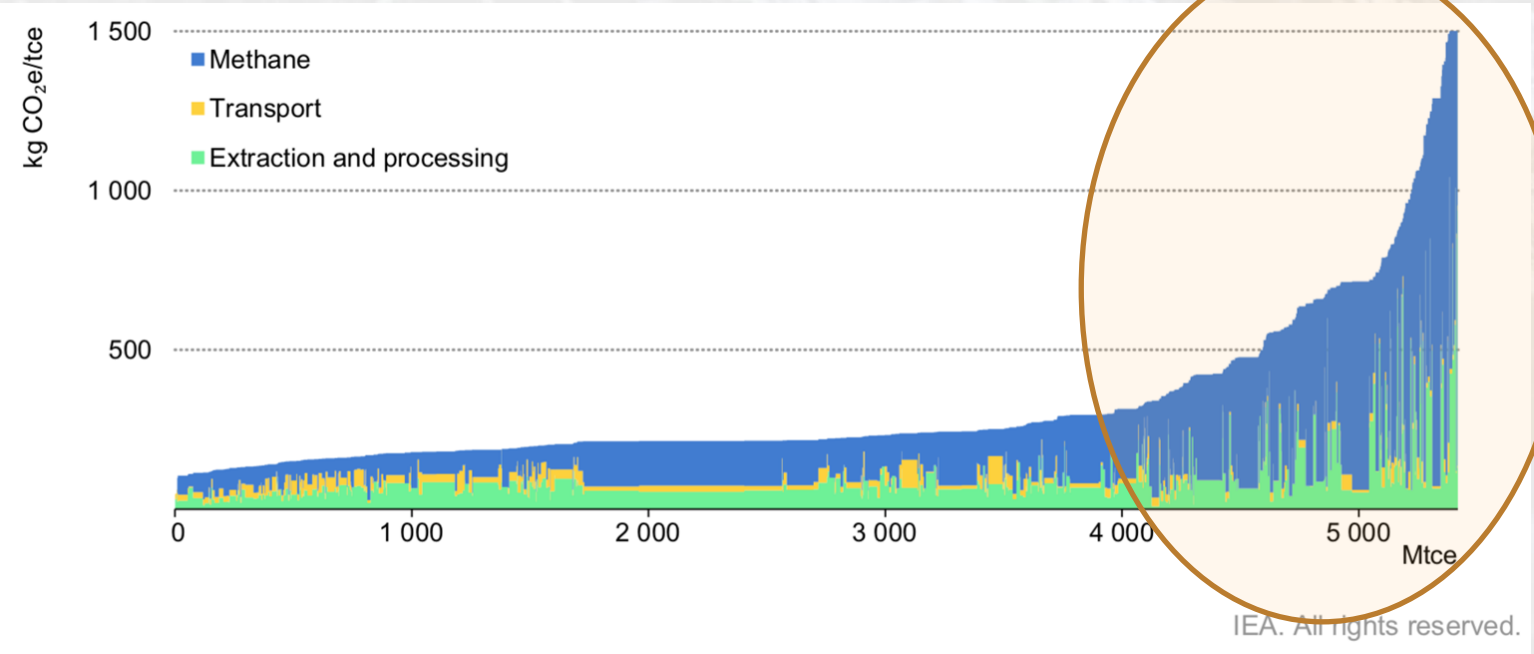
Different types of Methane



Not all mines equal



Source: IEA

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Mitigation of Vented Methane:

Higher concentration:

- Flaring
- Sale to Grid or local industries
- Power generation

Lower concentration:

VAM Oxidation

Images: *Green Gas International, Hofstetter, DPB Czech, DURR.*

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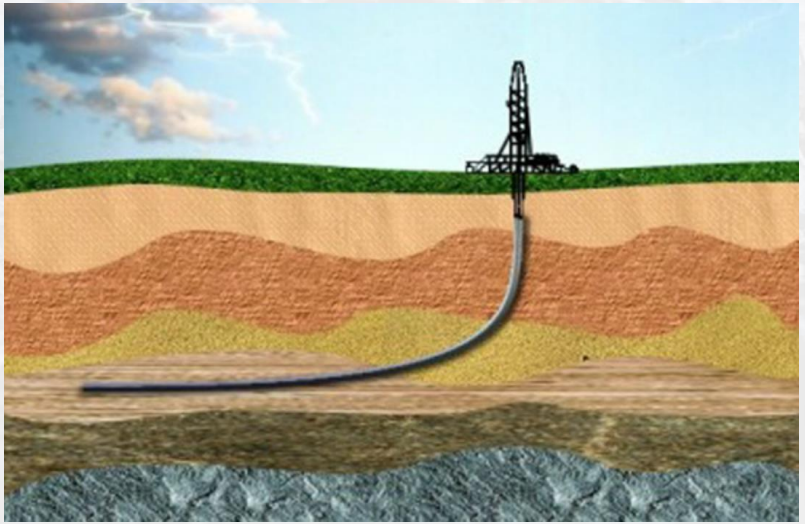
Pre-mining Drainage

Drilling of vertical or directional wells into the coal seam or adjacent strata, like you would with CBM

Sometimes years before mining operations or when the mine expands.

Drained Methane can be flared, sold to gas grid or used to produce electricity. Sadly, it is often vented.

The process makes mining safer and more efficient due to lower gas factor.



Commonwealth Scientific and Industrial Research Organisation (CSIRO)

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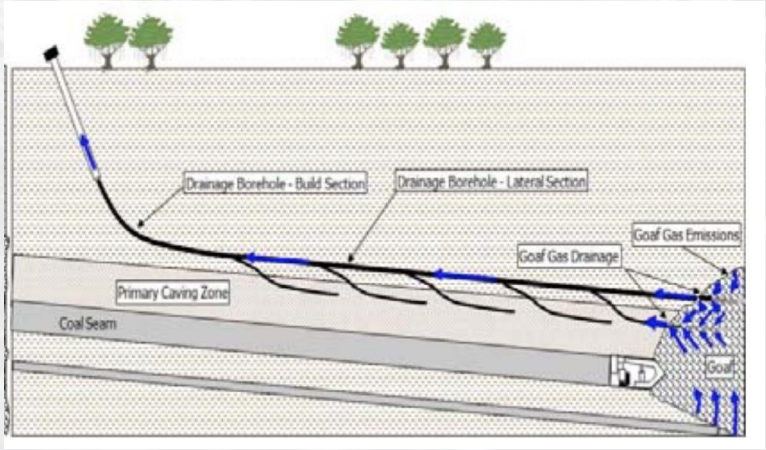
Mining Drainage from Surface.

Drilling of vertical or directional wells into the coal seam or adjacent strata

Done during mining process.

Drained Methane can be flared, sold to gas grid or used to produce electricity. Sadly, it is often vented.

The process makes mining safer and more efficient due to lower gas factor.



Black DJ, Aziz NJ. Improving UIS Gas Drainage in Underground Coal Mines.

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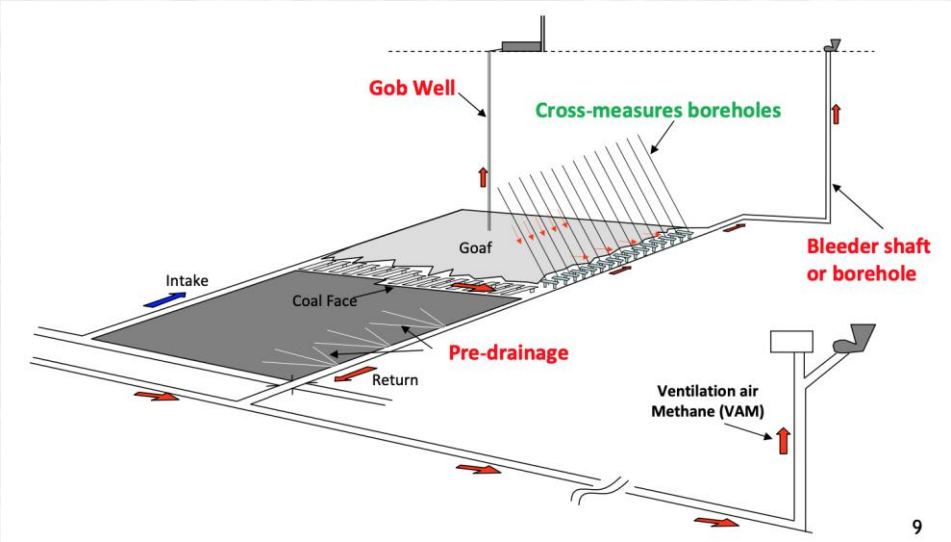
Mining Drainage from Sub-surface.

Drilling of directional wells into the coal seam or adjacent strata, from within the mine.

Done during mining process, with gas transported to pumping station.

Drained Methane can be flared, sold to gas grid or used to produce electricity. Sadly, it is often vented.

The process makes mining safer and more efficient due to lower gas factor.



Green Gas International

Ventilation Air Methane Destruction

Installation of equipment, to capture methane reach ventilation air and destroy the methane.

Done during mining process, using VAM oxidysers, which destroy 95%+ of methane that passes through them.

Destroyed methane generates heat, which can be used to produce electricity, but the economics are challenging

The process should have no effect on mine safety or operational efficiency.

Fortman Clean Energy

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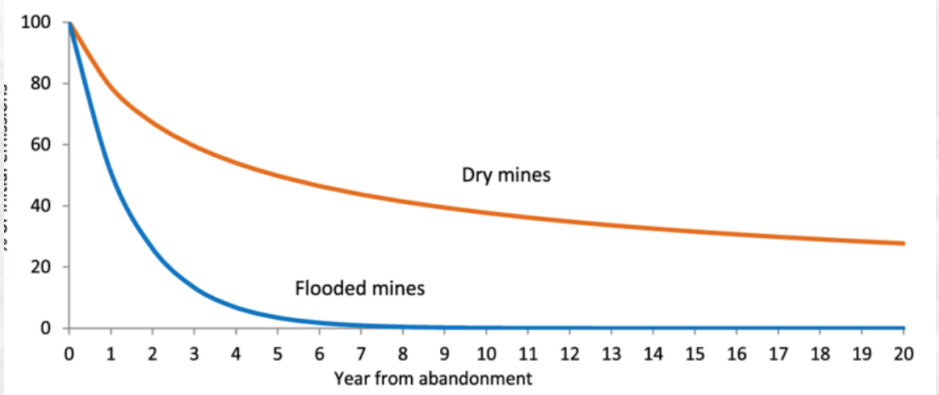
Abandoned Mines - Flooding

When mine closes, the mine gets flooded, which traps the methane in the coal seams.

Excellent option, but not always viable as can affect surface water or cause ground collapse.

Also, flooding of abandoned mines can lead to the flooding of adjacent, operational mines, leading to major problems.



Kholod, Pilchner.

Abandoned Mines, capture and destruction

When mine closes, the mines get sealed, with pumping and power generation equipment installed.

Captured methane can be used to generate electricity.

The economics can be very good, but will not pay for the upkeep of the closed mines – i.e. dewatering.

Green Gas Germany

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Global Summary:

CMM Utilization data is very difficult to cross-reference and extract. Australia, Poland, USA and Germany have very good data, with Russia and China publishing far less data.

Australia: 649 ktCH4 vented, 261 ktCH4 captured to generate electricity and 297ktCH4 flared

Poland: 60-70% of methane vented into the atmosphere.

Germany: over 90% of AMM, captured and utilized.

Ukraine: Much of the mining industry ended up in a conflict zone, making measurements and reporting very difficult.

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Conclusions:

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Summary

Processes dependent on the operational characteristics of the mine, geological parameters, access to customers of electricity, incentives, legislation, etc.

Many of CMM drainage and utilization projects have excellent economics, as they improve mine's operations and lead to revenues from sale of gas, heat and/or electricity.

In some cases, the CMM destruction is quite expensive, but still affordable compared to the costs of methane emissions.

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Global Coal industry is doing a lot to drain CMM, but mostly from the perspective of safety and productivity

Much more activity should be targeted, to capture and destroy CMM - particularly VAM;

National and global policies are necessary to promote the mitigation of methane emissions.

As always, quality measurement and reporting of CMM emission from different sources.

Thank you

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