

Fair methane reporting methods for coal mines

Australian Projections provides actuarial advice on issues of national policy, such as aged care, education, energy and climate. We are trying to help Australians and their politicians contribute to climate policies. This submission to the Climate Change Authority is in relation to their review of the NGER Act 2007. Please contact Dr Richard Cumpston on 0433 170 276 or richard.cumpston@gmail.com with any questions.

Summary

In a submission to the Authority on 28 June 2023, we noted that Australia's open cut black coal mines have reported over the last 20 years emission intensities only about one-tenth of those reported by underground mines.

DCCEEW data suggest that the methane content of Queensland coal increases linearly with depth. Based on the very limited data available on the depths of open cut and underground mine, we estimate that open cut emission intensities should on average be about 40% of those of underground mines.

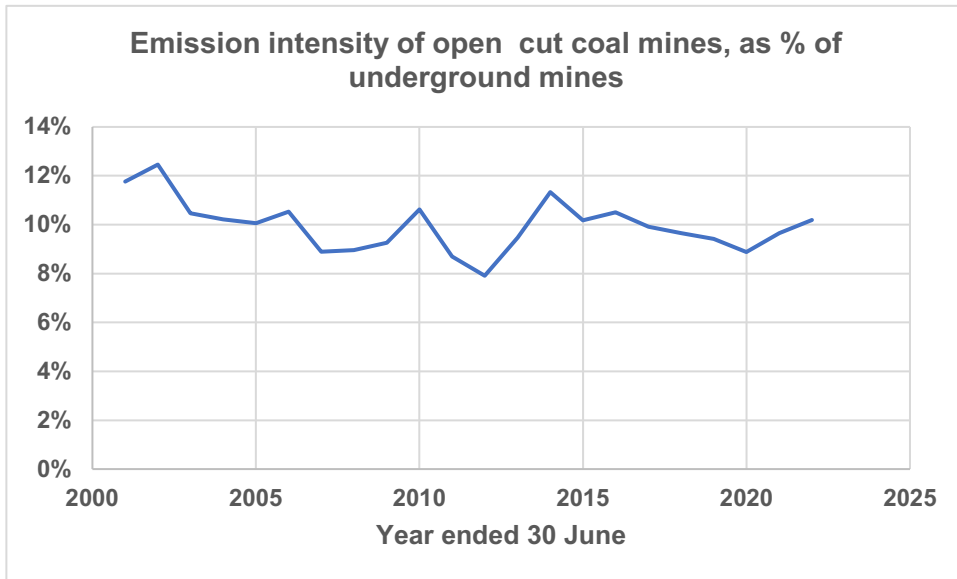
The severe under-reporting of emission by open cut mines reflects the common use of methane reporting method 1. This method is intended to give a fair estimate of average emission intensity over all open cut mines in a state.

But the introduction of methods 2 and 3 has allowed low emitters to report their actual emissions, leaving the only open-cut mines using method 1 as the above-average emitters. These are likely to be the deepest mines, with high production.

Under the new Statutory Mechanism, the use of method 1 unfairly rewards coal mines reporting under that method, and unfairly penalizes other coal mines. It encourages open cut rather than underground mining, with environmental consequences. It results in our national methane emissions being under-estimated, with risks for our international reputation and trade.

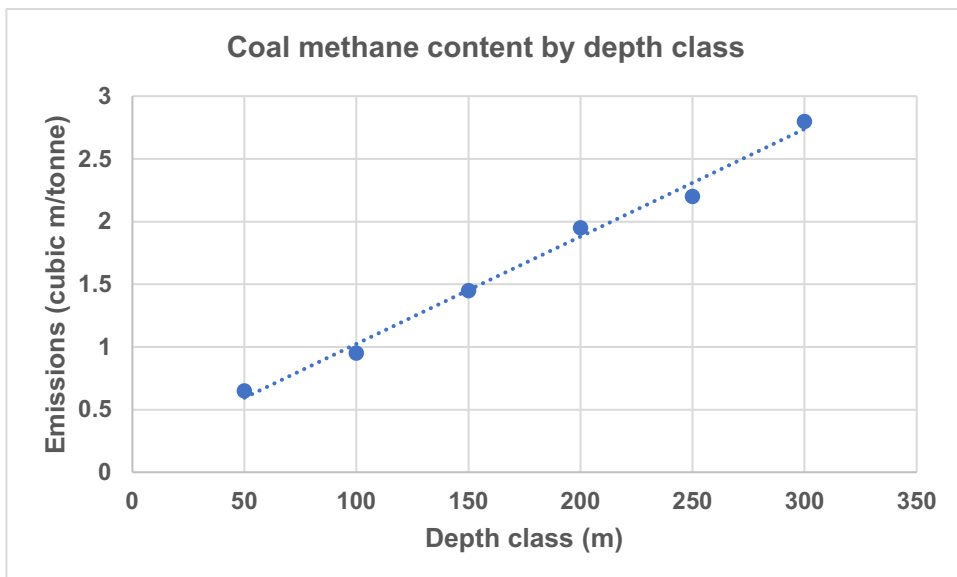
We strongly recommend the replacement of present methane reporting methods for open cut coal mines by direct measurement at the mine surface.

1. Emission intensities of open cut and underground coal mines



The above emission intensities of Australian open cut black coal mines, as percentages of those from underground mines, are from section 2.4 of our submission of 28 June 2023 to the Authority, titled "Underestimation of coal mine emissions". Over the last 20 years, open cut black coal mines have reported intensities only about one-tenth of those reported by underground mines.

2. Methane content of coal increases with depth



The above graph is from DCCEEW's consultation paper on proposed amendments to the NGER Scheme. It is based on about 1100 drill samples from the Queensland Government's Petroleum Exploration Dataset, selected so as to exclude samples from outside active coal mine fields. Drillhole observations were aggregated into 50 metre depth classes.

3. Depths of open cut mines in Queensland

A review of coal mine environmental planning documents was conducted by DCCEEW to determine common operating depths of Queensland open cut coal mines. These depths were combined with the average methane content analysis for each depth class, resulting in an emission factor of 1.65 m³ of methane per tonne of run-of-mine coal produced. This converts to 0.031 tonnes CO₂ equivalent per tonne of run-of-mine coal, the new method 1 value introduced for Queensland from 1 July 2023.

4. Underground coal mine depths

Most longwall coal mining occurs at depths of 200 to 600 metres in NSW, and usually at a shallower depth in Queensland (IESC 2014). Some underground mining occurs at shallower depths, using older mining techniques. The deepest coal mine in Australia was the Balmain Colliery, at about 800 metres (Wikipedia).

5. Expected ratio of emission intensities for open cut coal mines, compared with underground mines

Assuming that open cut mines are on average 165 metres deep, and underground mines are 400 metres deep, suggests that open cut emission intensities should on average be about 40% of those of underground mines. This is much higher than the 10% average over the last 20 years.

Abbreviations

DCCEEW	Department of Climate Change, Energy, the Environment and Water
IESC	Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development
NGER	National Greenhouse and Energy Reporting

References

Australian Projections Pty Ltd (28 June 2023) *Underestimation of coal mine emissions - submission to Climate Change Authority*

DCCEEW (3 April 2023) *National Greenhouse and Energy Reporting (NGER) Scheme - 2023 Proposed Amendments Consultation Paper* <https://consult.dcceew.gov.au/2023-nger-scheme-proposed-updates> (accessed 4 September 2023)

IESC (June 2014) *Fact sheet - Subsidence from longwall coal mining* <https://www.iesc.gov.au/publications/subsidence-longwall-coal-mining> (accessed 4 September 2023)

Wikipedia *Balmain Colliery* https://en.wikipedia.org/wiki/Balmain_Colliery (accessed 4 September 2023)