

Boggabri Coal Mine Modification 10 EPBC ref 2024/09887

Submission to Australia's Department of Climate Change, Energy, Environment and Water on the proposed modification of Boggabri coal mine and the potential for it to have a significant, under evaluated impact on fugitive emissions increases.

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About Ember

Ember is an independent, not-for-profit energy think tank that aims to accelerate the clean energy transition with data and policy. It gathers, curates and analyses data on the global power sector and its impact on the climate, using cutting edge technologies and making data and research as open as possible. It uses data-driven insights to shift the conversation towards high impact policies and empower other advocates to do the same. Founded in 2008 as Sandbag, it formerly focused on analysing, monitoring and reforming the EU carbon market, before rebranding as Ember in 2020. Its team of energy sector analysts are based in Australia, the EU, Asia and the UK.

A failure to adequately assess and mitigate fugitive emissions

Ember welcomes the opportunity to make a submission to the federal Department of Climate Change, Energy, the Environment and Water (DCCEEW) on the Boggabri Coal Mine Modification 10 EPBC ref 2024/09887.

Ember's submission is solely in relation to the potential fugitive emissions increase related to the proposed changes in mining, especially considering the current fugitive estimate for Boggabri, the significant increases in mining depth, and the lack of appropriate mitigation plans.

Despite the increasing urgency to address climate change, the Boggabri Coal Mine has failed to conduct a comprehensive and transparent assessment of its greenhouse gas emissions to date, and failed to appreciate the potential significant increase in emissions that may result in expanding coal mining for an additional 7 years, in significantly lower coal seams.

This oversight is particularly alarming given the increased understanding of the critical need to improve fugitive emissions estimates [from the 2023 NGERs review](#), the importance of all sectors to contribute to meeting both state and Federal Net Zero targets, Australia's support for the Global Methane Pledge, and the growing global [imperative](#) to recognise and rapidly act to reduce methane emissions due to their dual impact on increased surface ozone and rapidly warming the global climate.

This will have a significant impact on local ecosystem and population health, as well as undermining the broader climate challenge facing current and future generations of Australians.

Specifically, Ember would like to highlight these concerns relating to the Boggabri Coal Mine:

- 1. Direct Fugitive Emissions Calculations are 95x lower than NSW Method 1 guidance**
- 2. Projected Scope 1 emissions could be 9 million tonnes higher**
- 3. Direct emissions monitoring will likely be widespread before the Modification begins**
- 4. There is no current assessment of how methane emissions may increase with depth**
- 5. Insufficient Measures to Manage Fugitive Emissions**

1. Direct Fugitive Emissions Calculations are 95x lower than NSW Method 1 guidance

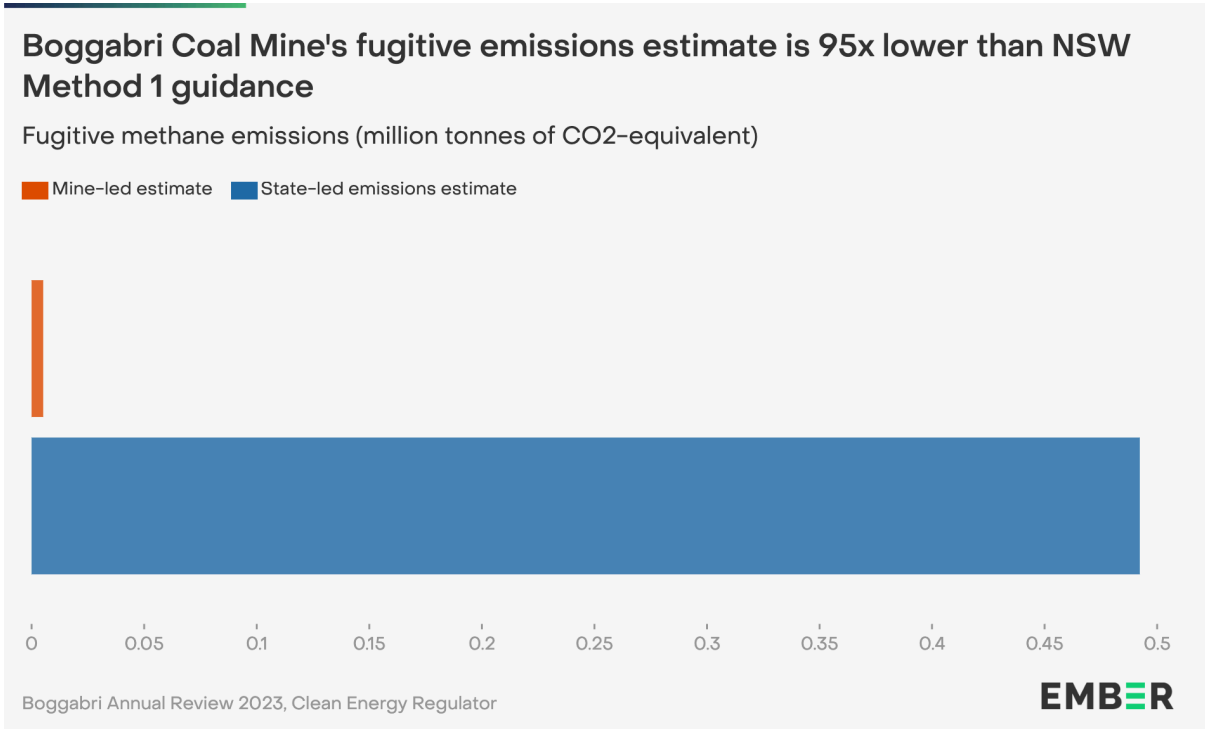
The initial [Air Quality and Greenhouse Gas Assessment](#), developed on behalf of Boggabri Coal mine, utilises the NSW government estimate for coal mine fugitive emissions under Method 1. This approach initially estimated fugitive emissions intensity of 0.04557 t CO₂-e/t ROM coal. Since then, the NSW Method 1 fugitive emissions estimate has been increased to 0.061 t CO₂-e/t ROM coal, in accordance with IPCC updates AR4, AR5 and AR6.

As such, reported fugitive emissions from the mine should have increased substantially, but this increase has not been reflected in any action from the mine to assess, investigate opportunities for, or actually reduce these emissions. In the 2013 [Air Quality and Greenhouse Gas Assessment](#) developed by Pacific Environment Limited, there was no update of greenhouse gas emissions caused due to mine modifications. This was also the case in their 2018 [Air Quality and Greenhouse Gas Assessment update](#).

This lack of attention to fugitive emissions is likely the result of a self-led fugitive emissions re-estimation that occurred over a decade ago. While mining has continued to occur in deeper and deeper seams, Boggabri Coal mine estimates that their fugitive emissions intensity is equivalent to 0.00064 t CO₂-e/t ROM coal. This is according to a self-led sampling process that has not been made publicly available, peer reviewed or re-assessed since its original estimation, likely between 2011 and 2012.

As a result, Boggabri Coal Mine has and currently [estimates their fugitive emissions](#) intensity to be among the lowest in Australia, approximately **95 times lower than the NSW state-led Method 1 recommendation**.

The use of this low fugitive emissions estimate enabled the coal mine to report total Scope 1 emissions of 192,864 t CO₂-e last year. However, if the coal mine was reporting its emissions according to Method 1 in NSW, **it would have reported total Scope 1 emissions of 685,134 t CO₂-e**.



As such, the use of an unverified Method 2 estimate for Boggabri Coal Mine’s fugitive emissions currently leads to an annual write-down of total reported Scope 1 emissions of close to 500,000 tonnes of CO₂-e per year. This is a 3.5x reduction on what the Coal mine would otherwise be reporting if it utilised the state-recommended emissions factor.

The scale of this difference is also recognised in the mine’s [Annual report for 2023](#), where fugitive emissions estimates in 2010 are compared against emissions reporting for 2023-2024.

Table 6-14: Comparison of 2010 EA Emissions Predictions and 2022-23 NGER Report

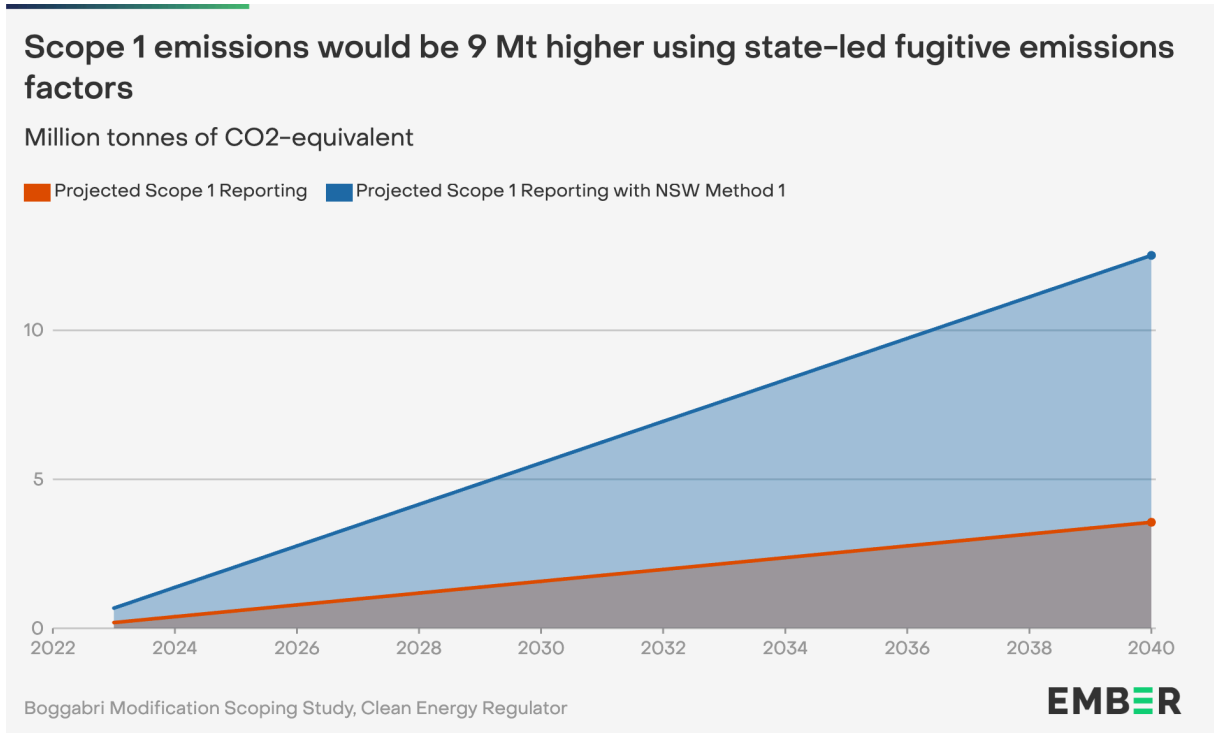
GHG (t CO ₂ -e)	2022-2023 NGER Report	2010 EA Emissions Predictions
Scope 1 - Industrial Processes	5	no comparable data estimated
Scope 1 - Fugitive Emissions	5,175	329,763
Scope 1 - Fuels Usage	187,684	136,920
Scope 1 - Total	192,864	466,683
Scope 2 - Electricity Consumption	14,769	3,233
Total Scope 1 and Scope 2	207,633	469,916

2. Projected Scope 1 emissions could be 9 million tonnes higher

The current [Modification](#) proposal is seeking approval to mine an additional 58.1 Mt of ROM coal, over 7 more years between 2033 and 2040. This will result in significant emissions increases in NSW. According to the [currently utilised reporting approach](#) for Boggabri coal mine, we estimate this requested mining extension will result in an **additional 1.58 Mt of CO₂-e**, reported as Scope 1 emissions alone.

However, when considering the scale of difference between the current estimate of fugitive emissions and what would be reported using NSW Method 1 guidance, there is also a significant risk of under-reporting.

Using the existing NSW Method 1 guidance, and an average annual mining production rate during the requested extension period, our analysis indicates that **this Modification would result in an additional 5.57 Mt of CO₂-e**, reported as Scope 1 emissions, if the Method 1 fugitive emissions factor was utilised.



Ember is unable to assess the veracity of Boggabri’s Coal Mine’s fugitive emissions estimate, as it is not publicly available. However, the current estimate for the mine’s fugitive emissions factor is one of the lowest in the country, is over a decade old, and the sampling methodology and results have yet to be externally verified, peer reviewed or publicly scrutinised.

The scale of difference between Boggabri coal mine’s likely reported Scope 1 emissions, and their emissions reporting utilising the NSW Method 1 fugitive emissions factor would be material. According to our analysis, the scale of difference in Scope 1 reporting could be in excess of 9 million tonnes of carbon dioxide equivalent.

3. Direct emissions monitoring will likely be widespread before the Modification begins

Due to rapid advances in satellite, aerial and other innovative coal mine measurement approaches, it is highly likely that direct emissions measurement for open-cut mines will become far more widespread in the next few years, and certainly before Boggabri's Modification begins in 2033. This is certain to impact fugitive emissions estimates during the period of the mine's requested mining Modification, and could have material impact on the facility's emissions contribution at the state and Federal level.

Not only are satellite emissions estimates increasing in accuracy, attribution and source diversity, but they are becoming far more widely accessible. In their [2024 Global Methane Tracker](#) update, the IEA highlighted that while not the panacea just yet, the growth of satellites, data providers and computational capacities is rapidly improving. Data from satellites with different spatial resolutions and detection limits are already being combined to fill gaps in existing top-down emissions estimates. In the next year alone, results from the Open Methane platform and MethaneSat will begin to be released publicly. This increase in transparency will continue in the coming years, as satellite providers, analysts and machine learning integrations continue to increase exponentially.

In addition, recent innovations in [drone-aerial emissions surveys](#) have shown both utility and efficiency in measuring methane emissions across vast oil and gas pipelines across the US, and a swathe of new operators and technologies are now being [certified](#) to measure emissions in real time by the US EPA.

Finally, advances in measurement approaches utilising stationary laser-sensing technology such as [EM27/SUNs](#) and [innovative assessments of existing safety sensor networks](#) have also shown promising initial results as opportunities for advancing direct emissions monitoring on open-cut mines.

The rapid scientific progress and increasing international interest in this space were also noted in [the 2023 NGERs review](#), which recommended that Australia urgently review, invest and upgrade its direct methane measurement capacity.

As such, we believe that it is only inevitable that direct emissions measurement on open cut coal mines such as Boggabri will become widespread. While the rate of adoption is unclear, we believe direct measurement is likely to be incorporated within the NGERs scheme within the decade, and will play a critical role in improving emissions estimates on open cut coal

mines well before the beginning of Boggabri coal mine's requested extension (from 2033 onwards).

4. No Assessment of how methane emissions may increase with depth

A key element of the Boggabri mine modification is that the mine is seeking to expand its mining from the Merriown Seam down to the "deepest section of the Templemore Coal Seam". It is highlighted that this is the "[lowest](#) seam in the Maules Creek Coal Measures area".

According to the estimates presented in their [Modification scoping study](#), this could result in a shift from mining estimated at a depth of "around 180m", to mining being conducted between 90 to 110m deeper than this level. While not clearly outlined in the [scoping study](#), if these depth estimates are accurate, it would indicate a potential mining depth of 270 - 290m. This is similar to the depths of many underground mines that directly report significantly higher fugitive emissions.

In the [scoping study](#), Boggabri coal mine insists that this shift in depth is needed to recover an additional "61.6 Million tonnes (Mt)" of coal. This represents a significant portion of their future mining proposal. According to Boggabri coal, they do not believe that this increase in depth will have any impact on emissions. They state that "*it is considered that greenhouse gas emissions will likely remain consistent with those reported for the current operations at BCM, albeit for a further seven years beyond those approved for MOD 7 (including the three years approved by MOD 8).*"

However, mining depth has been long established as one of the key determinants of the relative gassiness of coal. The IPCC's [Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories](#) identified this relationship in the late 1990's, alongside coal rank. This relationship was reinforced consistently in subsequent IPCC updates AR4, [AR5](#) and [AR6](#). Since then, there have been numerous [studies \(here & here\)](#) highlighting that [mining depth will have an impact on methane emissions](#). While the relationship is not always [linear](#), it is well established that with any significant depth shift, fugitive emissions may also change.

In contrast, the proposed expansion of Hunter Valley Operations (HVO) indicated [significantly increased emissions estimates](#) as the mine proposed to mine deeper coal seams. Here, HVO planned to mine a similarly deep, yet separate coal seam (the Barret Seam) and estimated the fugitive emission intensity could be between 0.0952t CO₂-e / t ROM to 0.13328 t CO₂-e / ROM t.

While Ember cannot ascertain the accuracy of these estimates without transparent access to the sampling data and methodology, the Boggabri coal mine should at least be held to the same standards, and ensure not only that they accurately measure the methane intensity of their coal mine, and its potential expansion, but that their results be compared to those of the Hunter Valley Operations.

A thorough assessment of the impact of mining at a significantly deeper coal seam should be conducted before this Modification is approved. While it has been noted that Airen consulting has been commissioned to conduct a revised GHG assessment, without results at this stage, the Modification's impacts cannot be appropriately understood.

This is not only in line with the recommendations of the [NSW EPA Guide for Large Emitters](#), but critical for state and Federal regulators to clearly appreciate the true scale of this modification, and the impact it may have on short term warming and surface ozone creation.

5. Insufficient Measures to Manage Fugitive Emissions

To date, the Boggabri coal mine has yet to display any recorded interest in sufficiently evaluating or implementing measures to mitigate fugitive emissions. This was highlighted by the lack of consideration for fugitive emissions management in [2022](#), or within the current [scoping report](#) prepared this year. In fact, "fugitive emissions" are not even mentioned in any of the above listed modifications or Air Quality and Greenhouse Gas Assessments.

In contrast, HVO's planned expansion included not only more detailed assessments of coal mine methane that increased significantly with depth, but proposals for a third-party peer review of an assessment of the potential for pre-mine drainage to reduce methane from the mine.

In that case, we support the [recommendation from the NSW EPA](#) to ask for that pre-mine drainage assessment and peer review to be conducted prior to the mine's approval, and believe the same standard should be applied to Boggabri coal mine, which is similarly seeking approval to conduct significantly deeper mining, at a similar depth to many underground mines.

We also believe that a similar peer-reviewed pilot assessment should be conducted at Boggabri such that the results can be properly considered before considering future mining modifications at the site.

Given the pressing need to reduce greenhouse gas emissions, and the global [imperative](#) to identify and rapidly mitigate sources of methane, I urge the government to require a thorough re-evaluation of the Boggabri Coal Mine's emissions assessments, and insist on a full peer-reviewed assessment of the potential to implement pre-mine drainage onsite before any Modification is considered. The potential additional fugitive emissions of this Modification will have a significant impact on surface ozone creation and rapidly add to global warming in the decades after the potential fugitive methane is released. This will have a significant impact on local ecosystem and population health, as well as undermining the broader climate challenge facing current and future generations of Australians.

Thank you for considering this important matter. I look forward to your prompt attention to these concerns.

Sincerely,

Chris Wright [he/him]

Senior Methane Analyst, [Ember](#)

Acknowledgement of Country

Ember acknowledges the Traditional Custodians of the many nations across Australia and their enduring connection to Country and the lands, seas and skies. We pay our respects to Elders past and present and extend that respect to all Indigenous Peoples today.