



24 May 2024

To: The Department of Climate Change, Energy, the Environment and Water
RE: National Greenhouse and Energy Reporting (NGER) scheme – 2024 proposed updates

Thank you for the opportunity for the Institute for Energy Economics and Financial Analysis (IEEFA) to provide input on the National Greenhouse and Energy Reporting (NGER) scheme – 2024 proposed updates.

IEEFA is an independent energy finance think tank that examines issues related to energy markets, trends, and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable, and profitable energy economy.

This submission comments on the proposed amendments to provisions relating to fugitive methane emissions from coal mining in Australia. IEEFA supports the Climate Change Authority (CCA)'s proposed update to phase out Method 1 for open-cut coal mine methane estimations, but also proposes a phase-out of Method 2 and updates to Method 3. Overall, changes to the NGER scheme should prioritise supporting open-cut coal mining companies to move towards direct measurement methods, and improve the reporting requirements to make emissions data more readily available to the public.

Kind regards,

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Summary

The longer it takes to improve accuracy in methane emissions reporting from coal mining, the harder it will be for Australia to accurately report on its national greenhouse gas emissions reduction efforts, and the more difficult it will become for independent research bodies to analyse the economic feasibility of emission reduction pathways.

1. IEEFA supports the CCA's recommendation to phase out Method 1 for estimating open-cut coal mine emissions.
2. The phase-out of Method 1 for estimating emissions should occur simultaneously with a phase-out of Method 2 and support a shift towards site-specific direct measurement methods as soon as possible. Method 2 still poses multiple levels of risk for significant underreporting to occur, with the potential for underreporting to worsen.
3. IEEFA is of the view that Method 3 should remain the lowest-order estimation method permitted for open-cut coal mines, with the associated standards referenced under Method 3 to be reviewed and updated as a matter of urgency, and a requirement for external peer review or independent verification processes to be added.
4. IEEFA questions the proposed two-year timeframe for coal mines to switch from Method 1 to Method 2 given that Method 2 is already a prevalent reporting method.
5. Methane emissions from abandoned, mothballed or decommissioned open-cut coal mines should also be accounted for.
6. IEEFA supports the CCA's view that there is a need to increase the availability of higher order methods for methane emission estimations. Moving towards direct measurement of methane emissions is crucial for Australian governments to make progress on emissions reduction strategies.
7. Currently the ability for the public to have their say on the implementation of Methods 2 and 3 is constrained by the privatisation of the methodology guidelines, which are only available online behind a paywall.
8. IEEFA supports the CCA's recommendation to develop a policy framework for implementing independent verification of facility-level fugitive methane emissions estimates using top-down measurements.
9. IEEFA supports the CCA's view that data transparency under the NGER scheme improves by making facility-level emissions data (including of greenhouse gas) publicly available. IEEFA is of the view that all coal mines in Australia should be required to report on this data and that they should also state which method was used to estimate methane emissions.
10. The GWP100 conversion rate used in the NGER scheme should be updated based on the Intergovernmental Panel on Climate Change (IPCC)'s latest Assessment Report.



Overview of methods for estimating fugitive methane from open-cut coal mines

There are currently four methods available for coal mines to estimate methane emissions under the National Greenhouse and Energy Reporting (NGER) Scheme. These are listed in increasing order of complexity below:

Method	General description	Applicable to:
1	Default emissions factors applied to run-of-mine (ROM) tonnes.	Open-cut mining
2	Facility-specific gas sampling, with standards applied to the analysis.	Open-cut mining
3	Facility-specific gas sampling, with standards applied to both sampling and analysis.	Open-cut mining
4	Direct gas measurement, either through periodic monitoring (PEM) or continuous monitoring (CEM).	Underground mining

Source: CCA;¹ IEEFA.

The Climate Change Authority (CCA)'s 2023 review of the NGER Scheme found that for open-cut mining:

- 72% of fugitive emissions were reported using Method 1 in Queensland.
- 26% of fugitive emissions were reported using Method 1 in New South Wales.

The CCA observed that: “The emissions factor for fugitive methane is lower in Queensland than in NSW, indicating that reporters may be incentivised to use Method 1 where the use of a lower emission factor may lead to a lower estimation of fugitive emission than higher order methods (Measurement Determination).² In contrast, in NSW where the emissions factor is higher, reporters may be incentivised to use higher order methods to estimate their fugitive emission from open cut mining.”

Phase-out of Method 1 for open-cut coal mines.

1. IEEFA supports the CCA's recommendation to phase out Method 1 for estimating open-cut coal mine emissions

The emissions factors under Method 1 used to calculate methane emissions from open-cut coal mines in Australia appear to be inaccurate, with multiple sources finding significant underreporting of Australia's methane emissions and subsequently its total greenhouse gas emissions. The CCA's review of the NGER scheme noted this when it examined the available evidence, stating that “discrepancies appear to be more prevalent between satellite observations and reported emissions for coal mining where simpler, lower order methods are available”; and

¹ CCA. [2023 Review of the National Greenhouse and Energy Reporting Legislation](#). December 2023.

² Ibid. Page 73. Note: For the year 2021-22, these were 0.023 and 0.061 tonnes CO₂-e [carbon dioxide-equivalent] per tonne of coal for Queensland and New South Wales respectively. In 2023, the Queensland Method 1 emission factor was revised to 0.031 tonnes CO₂-e per tonne of coal.

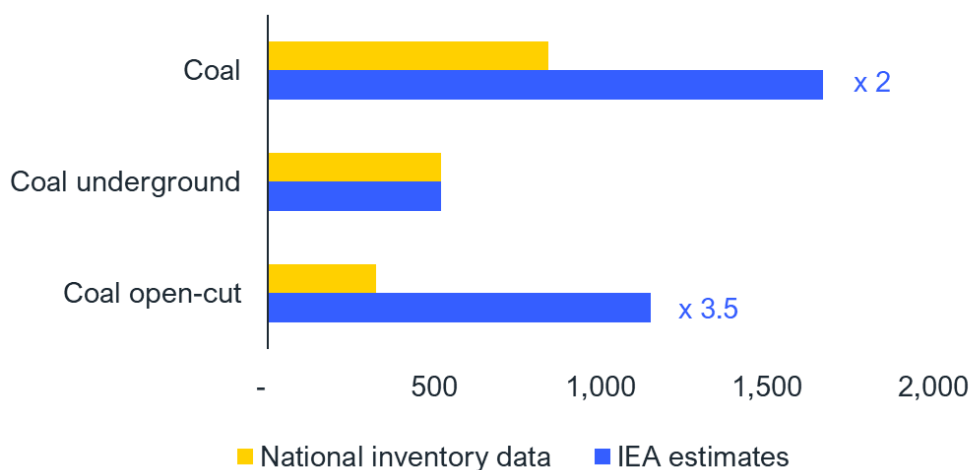
that “Simple emissions factors do not adequately capture temporal or spatial specificity or variability at the facility level”.³

There is a growing body of research and evidence indicating that methane emissions from Australian coal mines are significantly under-reported.

Research from the Superpower Institute has found that methane emissions from Australian open-cut coal mines could be more than twice as much as officially reported emissions.⁴

The International Energy Agency (IEA) recently released new data that finds methane emissions from Australian coal mining are twice as high as officially reported.⁵ Assuming that the reported emissions from underground coal mines are accurate, given that they are usually based on direct measurement, this would suggest that emissions from open-cut mines could be 3.5 times as high as reported.

Figure 1: Illustrative fugitive methane emissions from Australian coalmines, kilotonnes



Sources: IEA (and IEEFA analysis assuming no under-reporting in underground mines); Australian government.

Data from Global Energy Monitor (GEM) and Carbon Majors suggests that the emissions factor used by open-cut coal mines under Method 1 in Queensland could be 10 times lower than estimated in their reports.^{6,7} Additionally both the GEM and Carbon Majors data show that there can be significant variations in methane emissions between different coal seams and between

³ CCA. [2023 Review of the National Greenhouse and Energy Reporting Legislation](#). December 2023. Page 5.

⁴ Australian Financial Review. [Coal Mine Methane Twice Official Disclosures: Sims](#). 29 April 2024.

⁵ IEA. [Global Methane Tracker 2024](#). March 2024.

⁶ Global Energy Monitor. [Global Methane Emitters Tracker](#). November 2023

⁷ Carbon Majors. [The Carbon Majors Database: Launch Report](#). April 2024



coal types. Metallurgical (bituminous type) coal generally has higher methane emissions intensity than thermal.⁸

However, a switch from Method 1 to Method 2 would not automatically translate into greater accuracy of reporting. Phasing out Method 1 alone will not necessarily resolve methane under-reporting, and it may exacerbate the problem.

Additionally, as facilities shift from using Method 1 to using Method 2 or 3 to estimate their emissions factor, greater verification and monitoring would be required to ensure that these methods are being employed in accordance with Australian and international best practices to improve the effectiveness of their reporting.

2. The phase-out of Method 1 for estimating emissions should occur simultaneously with a phase-out of Method 2 and support a shift towards site-specific direct measurement methods as soon as possible. Method 2 still poses multiple levels of risk for significant underreporting to occur, with the potential for underreporting to worsen.

Method 2 does not account for methane emissions that can occur from a mine site prior to or during coal seam gas sampling. Prior to gas sampling taking place, mines may have already removed overburden, and methane may have already escaped from the coal seam. Methane can also leak during the gas sampling process depending on the process used.⁹ This means that the measurements recorded during the gas sampling process under Method 2 may result in an emissions factor that underrepresents the volume of methane that has already been released from the coal seam.

When Method 2 is implemented by operating open-cut mines, the gas sampling results could lead to an emissions factor that underrepresents the methane emissions from the mine, because the methane concentrations in the coal seam may be lower if methane gas has already been released from the coal seam during the mining process. This could also pose problems under Method 3 reporting, but there is potential that if the standards referenced under Method 3 are updated, they could include adjustments to the gas sampling results based on the concentration levels and the amount of overburden or mining that has already occurred at the mine. Alternatively, a combination of Method 3, combined with verification from other data sources such as satellite observations, could be used to try to mitigate this issue.

Additionally, the gas sampling results used in Method 2 to construct emissions factors require no third-party or external peer review process, meaning there is a risk that authors' bias could occur in the results used. The gas sampling results obtained under Method 2 are the critical component used to calculate the emissions factor employed in generating an emissions estimation. As such, it is imperative that the methodology and analysis to obtain the result undergoes a rigorous peer

⁸ IEEFA. [Growth in Australian open-cut coalmining raises urgency of methane abatement](#). 5 February 2024.

⁹ Energies. [The determination of the methane content of coal seams based on drill cutting and core samples from coal mine roadway](#). 28 December 2021. Szlczak, N., Korze, M. & Piargies, K.



review process. Because Method 3 requires reporters to comply with standards on how to conduct gas sampling, if these standards are updated based on recent academic publications and research, this could mitigate some of the underreporting risks prevalent in Method 2.

3. IEEFA is of the view that Method 3 should remain the lowest order estimation method permitted for open-cut coal mines, with the associated standards referenced under Method 3 to be reviewed and updated as a matter of urgency, and a requirement for external peer review or independent verification processes to be added.

IEEFA notes that government verification and monitoring would be required to ensure adherence with the standards under Method 3.

Presently, there seems to be little incentive for companies to report using Method 3 instead of Method 2, given that currently no open-cut coal mines report methane emissions using Method 3.¹⁰ Based on this information, phasing out Method 1 for open-cut mines may likely result in all open-cut coal mines using Method 2 to estimate their methane emissions, and it would be unlikely to incentivise a shift from Method 1 to Method 3 or 4 without additional intervention or amendments to the NGER.

IEEFA is of the view that a phase-out of Method 1 should occur alongside a phase-out of Method 2 and improvements to Method 3, to increase the quality of methane emissions estimations. Additionally, the guidelines for Method 3 for open-cut coal mines should be made publicly, freely available and updated based on best available scientific discourse that has emerged on coal seam gas analyses since the guidelines' publication in 2011.

Phasing out Method 1 and simply transitioning all mines reporting to Method 2 does not guarantee methane emissions reporting improves.

Method 2 is not tied to any form of agreed independent standards. Method 3 is the same as Method 2 except that it requires companies to adhere to two sets of standards on gas sampling and technical evaluation, published in 1996 and 1993 respectively. Both of these standards should be updated to account for improvements and changes in gas sampling techniques and coal seam gas quantification methods. The problems with Method 2 mentioned in section 2 of this submission should be addressed and accounted for when updating the standards mentioned in Method 3.

Method 3 should also add a requirement for external peer review or independent verification processes on the gas sampling methods and results used. IEEFA notes that government verification and monitoring would be required to ensure adherence with the standards referenced under Method 3. There is the potential that state-based EPAs could fill this role in New South Wales (NSW) and Queensland, given the recent decision in NSW to add requirements for an

¹⁰ CCA. [2023 Review of the National Greenhouse and Energy Reporting Legislation](#). December 2023.



applicants' expected greenhouse gas emissions and estimation methods in their environmental impact statements for coal mining operations.¹¹

Additionally, there is currently no mechanism in the NGER scheme to permit emissions estimates to be verified, monitored or altered based on real-world emissions observations, such as from satellite observations or direct measurement using infrared methane sensors. Given the uncertainty and discrepancies in reporting techniques in this space, there should be legislative mechanisms incorporated into the NGER scheme that support accessing the best available data to update and amend facilities' reported methane emissions.

Overall, updates to the NGER scheme should prioritise transitioning open-cut coal mines' reporting methods towards site-specific direct measurement methods as soon as possible.

4. IEEFA questions the proposed two-year timeframe for coal mines to switch from Method 1 to Method 2 given that Method 2 is already a prevalent reporting method.

For implementation of removal of Method 1 reporting, most mining companies are being given two years to implement Method 2 or above. This appears a long timeframe given that Method 2 is already a mainstream method.

5. IEEFA supports the CCA's view that there is a need to increase the availability of higher order methods for methane emission estimations. Moving towards direct measurement of methane emissions is crucial for Australian governments to make progress on their emissions reduction strategies.

The methods permitted under the NGER scheme to estimate open-cut coal mine methane have direct impacts on the feasibility of Australia's national emissions reduction target and the Queensland and NSW state-based emission reduction targets. If the estimation methods permitted in the NGER scheme result in underreporting of methane emissions, this risks the ability for governments' emission reduction targets to remain on track, and decreases the chances that they can be fully realised at all. There is also potential for facilities covered by the Safeguard Mechanism to apply to retrospectively adjust their baselines higher or lower, based on changes to methane emission reporting methods in the NGER. This should be considered by the Department of Climate Change, Energy, the Environment and Water (DCCEEW).

6. The ability for the public to have their say on the implementation of Methods 2 and 3 is constrained by the privatisation of the guidelines, which are only available online behind a paywall.

The guidelines for the implementation of Method 2 and 3 for open-cut coal mine fugitive greenhouse gas emissions reporting are not freely publicly available. The guidelines were developed by the Australian Coal Industry's Research Program (ACARP) in 2011 and are only

¹¹ NSW Environment Protection Authority. [Stricter controls to address climate change in planning decisions](#). 20 May 2024.



available behind a paywall.¹² Given the importance of understanding these guidelines to assess the ability for Method 2 and 3 to provide better estimations of methane emissions from Australian open-cut coal mines, these guidelines should be made available freely to the public.

7. Methane emissions from abandoned, mothballed or decommissioned open-cut coal mines should also be accounted for.

The estimation methods required under the NGER scheme discuss requirements to estimate post-mining methane emissions from underground mines, but this is not a requirement for open-cut coal mines. Because Methods 1, 2 and 3 all calculate an emissions factor to generate emissions estimates based on coal mine production, methane emissions that occur before, after or during pauses in coal mine production result in no methane emissions being reported.

IEEFA is of the view that it should be a requirement for methane emissions to be estimated from abandoned, mothballed or decommissioned open-cut coal mines. While more research is required in this space to understand the long-term methane emissions risks from open-cut coal mines post mining, the United Nations Economic Commission for Europe asserts that: “Abandoned mine methane (AMM) emissions are an inevitable byproduct of the coal mining cycle and can persist for decades.”¹³

8. IEEFA supports the CCA’s recommendation to develop a policy framework for implementing independent verification of facility-level fugitive methane emissions estimates using top-down measurements.

As noted by the CCA, “Over the past five years, developments in satellite technologies and inverse modelling techniques have resulted in a new source of data to estimate fugitive methane emissions from individual facilities.”¹⁴

IEEFA is of the view that reported emissions under the NGER estimation methods should be assessed against direct observation measurements from new data sources, such as satellite data. Currently Method 1 uncertainty is determined (by NGER) to be 50%, and for other methods (2 and 3) the level of uncertainty is determined in accordance with the ACARP guidelines.¹⁵

As new methods and data sources of directly measuring methane emissions become more widespread and more precise, the NGER scheme should have a provision or framework that allows these measurements to be used to help verify the estimated emissions reported by facilities. This verification process should be assessed by an independent body. These direct

¹² ACARP, [Guidelines for the Implementation of NGER Method 2 or 3 for Open Cut Coal Mine Fugitive GHG Emissions Reporting \(C20005\) and Technical Discussion of the Implementation of NGER Method 2 or 3 for Open Cut Coal Mine Fugitive GHG Emissions Reporting \(C20005A\)](#). December 2011.

¹³ United Nations Economic Commission for Europe. [Best Practice Guidance for Effective Methane Recovery and Use from Abandoned Coal Mines - ECE Energy Series No. 64](#). 2019. Page 1.

¹⁴ CCA. [2023 Review of the National Greenhouse and Energy Reporting Legislation](#). December 2023. Page 5.

¹⁵ Australian Government, Federal Register of Legislation. [National Greenhouse and Energy Reporting \(Measurement\) Determination 2008](#). Section 8.8 Assessment of uncertainty for estimates of fugitive emissions.



observations could also be used in place of NGER estimation Methods 1,2 and 3 as the technology progresses. This could also help better understand the level of uncertainty currently associated with the traditional estimation methods 1, 2 and 3 set out in the NGER scheme.

9. IEEFA supports the CCA's view that data transparency under the NGER scheme improves by making facility level emissions data (including by greenhouse gas) publicly available. IEEFA is of the view that all coal mines in Australia should be required to report on this data and that they should also state which method was used to estimate methane emissions also be reported.

"The [climate change] authority is of the view that increasing the transparency of the data collected under the NGER scheme is essential to ensure it remains aligned with the expectations of the public and the standards set internationally. In particular, the authority recommends that facility-level data (including emissions by greenhouse gas) be published for all but the very lowest emitting facilities."¹⁶

Currently coal mines are not required to report publicly on the methods used to estimate their methane emissions. Additionally, emissions from Safeguard Mechanism reporting facilities are not required to disclose their estimated methane emissions or other greenhouse gas emissions individually, but rather to only report a single figure in carbon dioxide-equivalent (CO₂e) units, meaning it is not possible to discern the ratio of methane and carbon dioxide emissions from individual sites using this data.

Emissions from Safeguard Mechanism reporting facilities should be publicly available and should report on carbon dioxide and methane emissions separately. Emissions data should be disclosed on a greenhouse gas disaggregated basis as well as in aggregate terms of CO₂e. The disclosure of gross emissions should be required, excluding any purchased or generated carbon offsets.

Coal miners in Australia should report these emissions at an individual asset or facility level. This is not an unprecedented requirement. Coal miners in Australia already must disclose a range of financial and sustainability indicators in their annual reporting. Additionally, this is already taking place in other major coal mining nations. In the United States, emissions reporting data is made available to the public to analyse and better understand methane emissions from the mining sector and to highlight opportunities for emissions reduction. Such benefits from data availability and transparency should accrue to Australia as well.

Such disclosures would enable estimates of methane, which is critical to understanding and managing the risks and abatement opportunities for the facility, including any proposed mine extensions or expansions. In addition, this would support independent research into economic cases for governments' emissions reduction targets to be achieved.

¹⁶ CCA. [2023 Review of the National Greenhouse and Energy Reporting Legislation](#). December 2023. Page 2.



10. The GWP100 conversion rate used in the NGER should be updated based on the latest IPCC Assessment report.

It is noted that the current NGER scheme uses a GWP100 conversion factor of 28, based on the Intergovernmental Panel on Climate Change (IPCC)'s Fifth Assessment Report.¹⁷ IEEFA proposes that the NGER scheme adopt the Global GWP values from the IPCC Sixth Assessment Report of 29.8kgCO₂e/kgCH₄.¹⁸

Underground coal mine emissions monitoring approaches – periodic or continuous

IEEFA supports the recommendation that underground coal mines would be required under Method 4 to report on which sampling frequency approach they use (PEM or CEM). This will improve consistency and transparency among reporters. Such information should again be made publicly available.

¹⁷ IPCC. [Fifth Assessment Report](#). 2014.

¹⁸ IPCC. [Sixth Assessment Report](#). 2021.



About IEEFA

The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

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