

# Submission to the Climate Change Authority's Issues Paper - May 2023

Ember's recommendations for setting, tracking and achieving Australia's emissions reduction targets, with a focus on the measurement and mitigation of coal mine methane.

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## About Ember

Ember is an independent, not-for-profit energy think tank that aims to shift the world to clean electricity using data. 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 and the UK.

## 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.

# Executive Summary

Ambitious coal mine methane emissions reduction can drive deep decarbonisation of the coal sector and Australia nationally.

Ember welcomes the opportunity to make a submission to the Climate Change Authority's (CCA) [Setting, tracking and achieving Australia's emissions reduction targets Issues Paper - May 2023](#) (the Issues Paper). Ember's submission provides our general recommendations for how the CCA should consult on reforming coal mine methane measurement and mitigation, and the implications of coal mine methane emissions for setting, tracking and achieving Australia's climate targets.

This submission covers the following questions outlined in the Issues Paper:

- What role is there for corporate action to 2030 and beyond, and when is it appropriate for the government to regulate something (questions 6 and 7)?
- What do you think Australia's 2035 target should be and why (question 9)?
- What are some leading indicators of progress towards net zero emissions (question 10)?
- What factors should the CCA consider when developing sectoral decarbonisation pathways, and what is the role should the government play to realise these opportunities (questions 12 and 13)?
- What do you see as the challenges and opportunities from a phase out of fossil fuel production? What should the Government consider when determining a plan for the phase out of fossil fuels (question 16)?
- What aspects of methane measurement, reporting and verification (MRV) should the Authority focus on as part of the *National Greenhouse and Energy Reporting Act 2007* (Cth) (NGER) review (question 22)?

**We urge the CCA to pursue an ambitious agenda for accurately measuring Australia's coal mine methane, and from that foundation, setting a trajectory for significant coal mine methane emission reductions to 2035 and beyond.**

Ember welcomes the opportunity to further consult with the CCA as part of the NGER review and the CCA's advice on emissions reduction targets for Australia's next Nationally Determined Contribution (NDC) under the *Paris Agreement*.

# 1. Corporate Action to 2030

Increased federal regulation of coal mine methane is appropriate.

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Fugitive emissions, including coal mine methane, are produced by Australian corporate entities and [constitute](#) 11% of Australia's total greenhouse gas emissions in 2022.

Voluntary corporate actions are an important avenue for ratcheting up ambition among Australia's coal companies. We are supportive of Australian companies joining the [Met Coal Methane Partnership](#) (MMP) and committing to onsite methane mitigation.

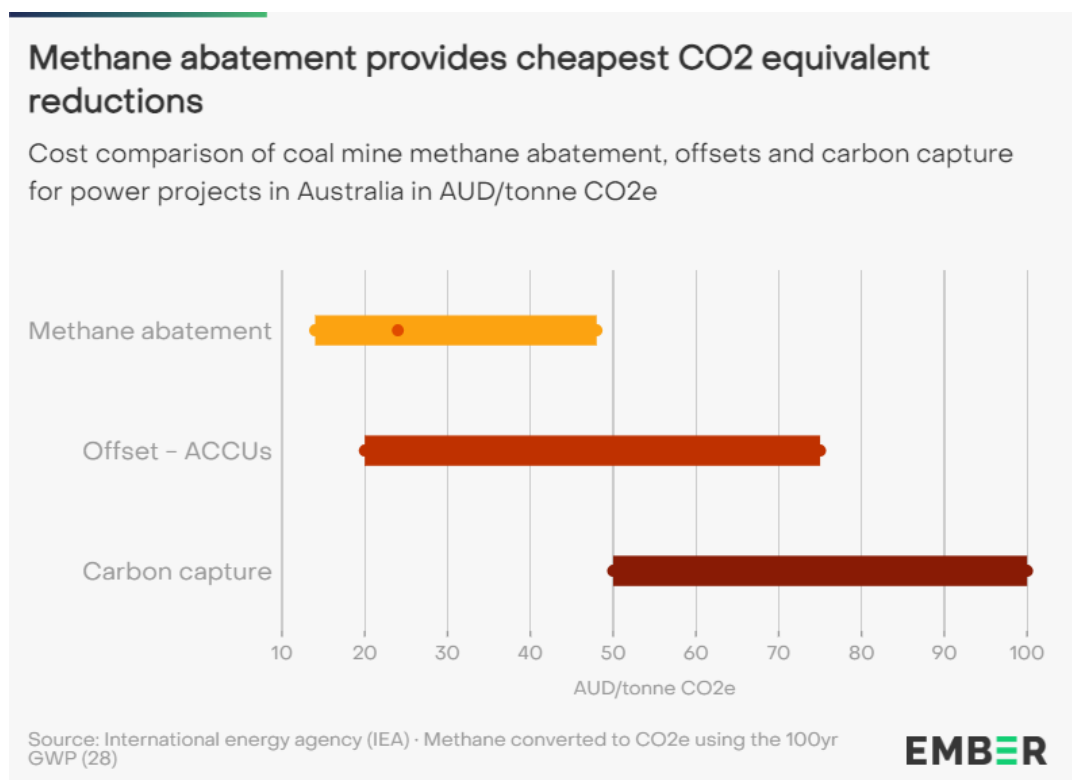
However, we emphasise that tackling Australia's coal mine methane problem requires consistent and ambitious action from **all** coal companies, otherwise gains made at one coal facility will be rendered meaningless by poor action at other mines. For example, Glencore's Hail Creek Open Cut Coal Mine has been [independently found](#) to emit up to 230,000 tonnes of methane per year, the equivalent of all of Queensland's current reported open cut coal mine methane emissions. The federal government [projects](#) that coal mine methane emissions may rise to 2028, while the International Energy Agency (IEA) is [urging](#) a 75% cut to coal mine methane emissions by 2030 to align with a 1.5C pathway.

In these circumstances, we consider it **entirely appropriate and necessary for the federal government to increase the regulation of coal mine methane measurement and mitigation.**

Our [analysis](#) indicates that the reformed safeguard mechanism will be insufficient to drive significant coal mine methane emissions reduction to 2030 and beyond. The capacity of the safeguard mechanism to drive methane emissions reduction is limited by the fact that the mechanism does not directly regulate or incentivise onsite methane emissions reduction by the coal sector. We have previously recommended that the safeguard mechanism should incorporate a separate production-adjusted emissions intensity baseline for methane to drive methane reductions, and urged against allowing Australia's major emitters to have unlimited access to carbon offsets to meet any methane emissions reduction targets.

We emphasise to the CCA that onsite methane mitigation is [technically and economically feasible](#) for the coal sector to implement over the short to medium term. Methane

abatement is, on average, a more cost effective source of emissions reduction than either ACCUs or carbon capture and storage projects.



We urge the CCA to specifically consider opportunities to improve federal government regulation of coal mine methane to deliver a comprehensive plan to reduce methane emissions from all coal facilities, namely:

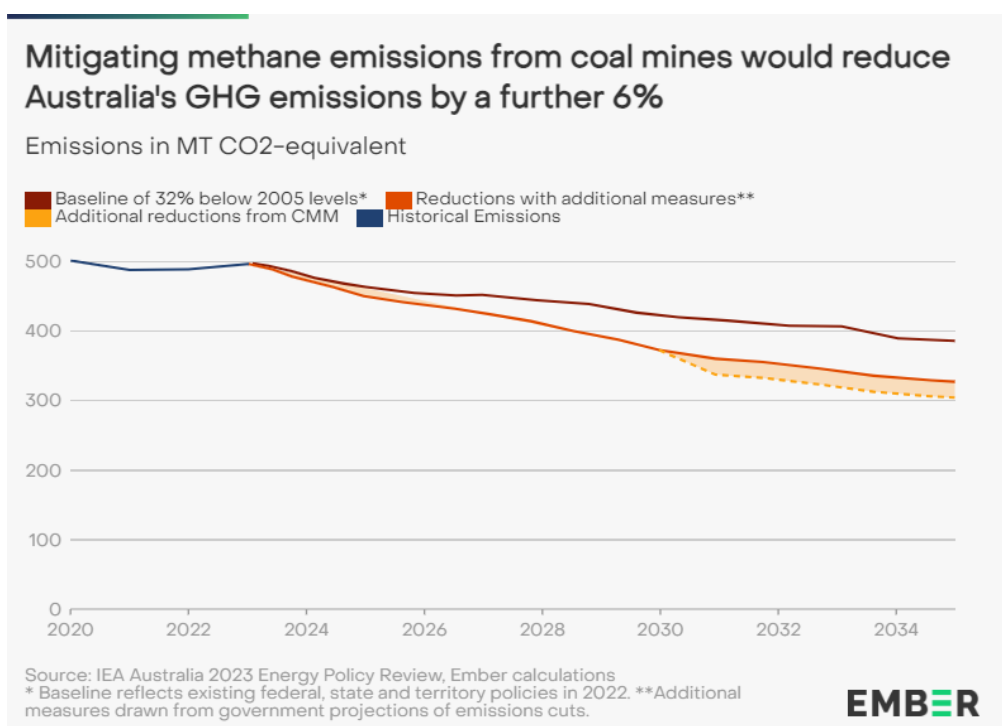
- a national methane reduction action plan, to ensure Australia meets its climate targets and supports industries to reduce the methane intensity of their production. Methane action plans have been implemented across the globe, including Canada’s [Methane Strategy](#); and
- opportunities to draw from best practice legislation from comparative jurisdictions, such as the USA’s [Methane Emissions Reduction Program](#) and the [EU methane regulations](#).

## 2. An Ambitious 2035 Target

The CCA should advise that the government pursue an ambitious 2035 target, including coal mine methane reduction opportunities and a just transition from thermal coal mining.

Ember encourages the CCA, in line with this commitment to review and ratchet up the scale of Australia's ambition, to advise the government to lift the 2030 target and set a significant 2035 target, aligned with the latest Climate Targets Panel [report](#).

We emphasise that coal mine methane emissions can be reduced significantly by 2030-2035. This reduction would include a balance of currently feasible onsite methane mitigation options across the coal industry, as well as a just transition from thermal coal mining and effective mine rehabilitation. Through this combined yet flexible approach to managing emissions over the next decade, coal mine methane emissions reduction represents a considerable greenhouse gas emissions cut to 2035.





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We estimate that Australia's coal mine methane emissions could be reduced by 78% by 2030-2035. This would be equivalent to a 6% reduction from Australia's total reported greenhouse gas emissions (2020).

Considering that coal mine methane represents close to one third of Australia's currently reported methane emissions, these reductions would also lead to an 18% reduction of Australia's total reported methane emissions in 2020.

To ensure the full emissions reduction potential of coal mine methane is realised, the CCA should incorporate a **standalone methane reduction target into the updated NDC**, to increase the scale of Australia's ambitious and leverage the emissions reduction opportunity afforded by tackling this [potent and short-lived greenhouse gas](#).

A methane reduction target would underpin an ambitious coal sector decarbonisation plan and a **national methane action plan**, that cuts across all sectors.

We urge the CCA to specifically consult on the following matters in relation to its recommendations regarding Australia's updated NDC:

- opportunities to deliver significant emissions reductions by targeting areas of the economy that, to date, have lagged in reducing their emissions. The government's current [43% by 2030 target relies upon 82% renewable energy by 2030](#), there is little capacity for the electricity sector to drive further significant emissions reductions to 2035. We urge ambitious action on coal mine methane emissions and [estimate](#) that Australia could reduce its coal mine methane emissions by 78% by 2030-2035, in line with both the [IEA's](#) and [Climate Analytics'](#) pathways to 1.5C; and
- threats to any 2035 target, namely, the impact of increased methane emissions from coal mine projects currently in the approval pipeline. Ember's 2022 [analysis](#) indicates that coal mine methane emissions could rise by up to 50% by 2030 if all of those projects went ahead.

### 3. Fossil Methane Indicator of Progress

The CCA should establish a standalone indicator of progress related to falling coal mine methane emissions.

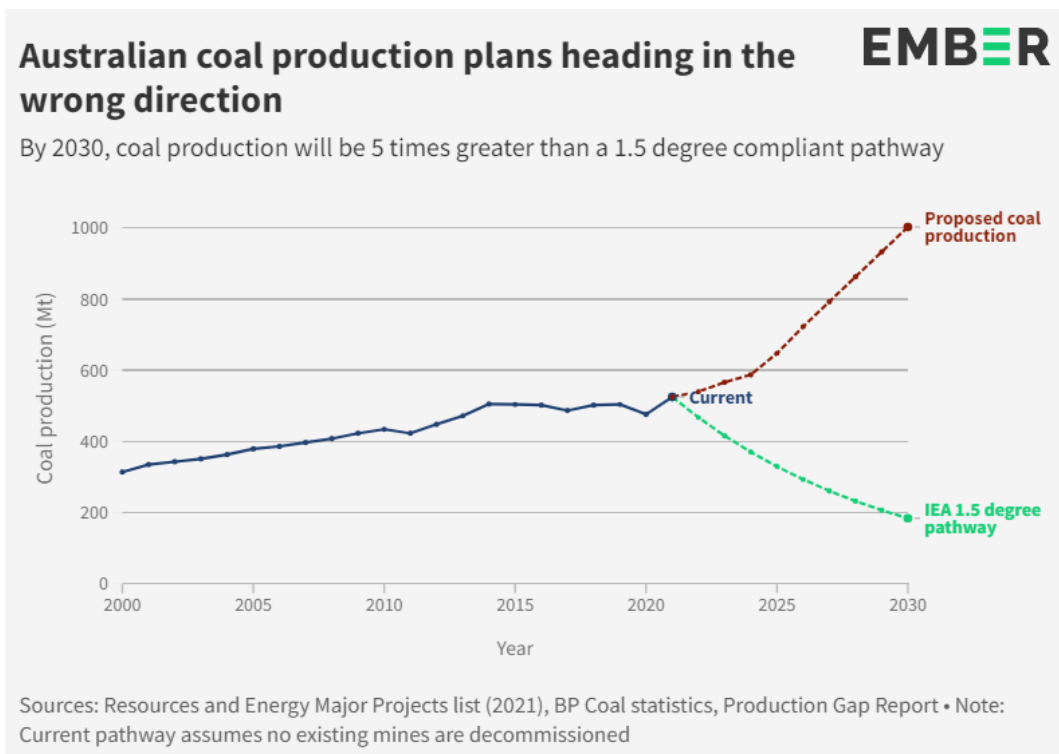
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Ember supports the CCA's consideration of leading indicators of progress towards net zero. Establishing and tracking indicators of progress will be essential for a timely and just transition to meet Australia's 2030, 2035, and ultimately, 2050 climate targets.

We urge the CCA to incorporate the [international understanding](#) that rapid reductions of fossil methane emissions must be achieved between 2030 and 2035, to allow time for harder to abate sectors to decarbonise in 2040-2050, into its development of leading indicators. We further encourage the CCA to investigate the impact of coal mine approvals and extensions on the trajectory for phasing out thermal coal mining in Australia in the 2030s, which is necessary for Australia's fugitive emissions trajectory to be [aligned](#) with a 1.5C pathway.

The coal sector is seeking approval for a range of new mines and extensions in 2023 with timelines for coal production into the 2050s and beyond (for example the [current Lake Vermont extension application](#)). Investment and approvals decisions made in 2023 regarding those coal projects therefore provides a trajectory/leading indicator of Australia's likely future fugitive emissions.



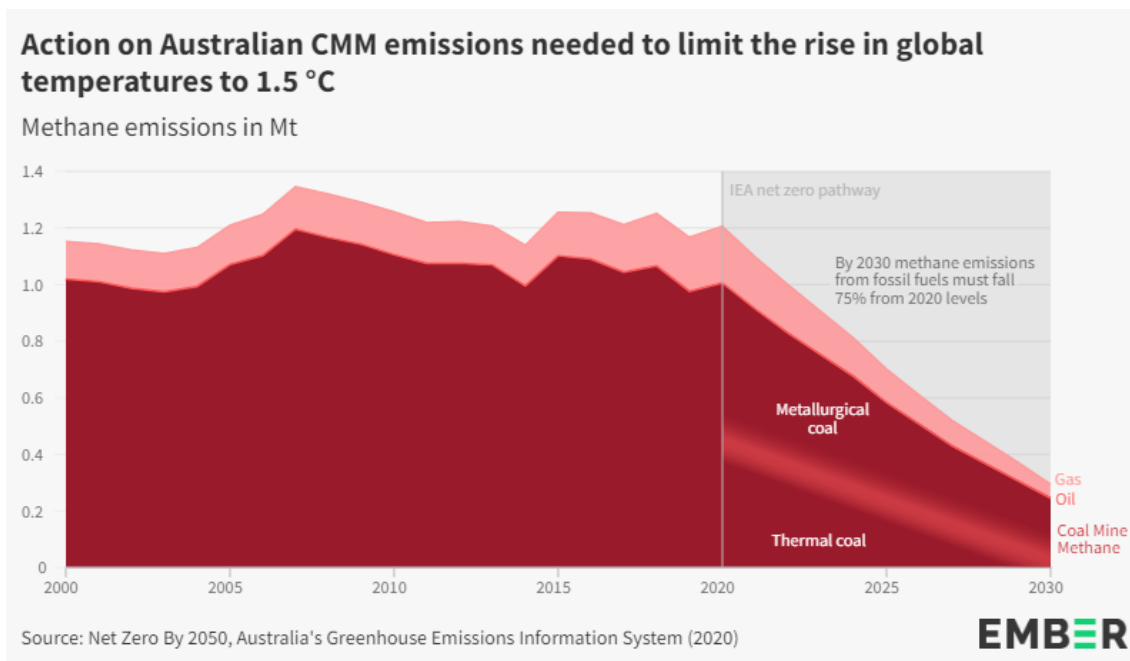


Predictions of coal production in 2023 provide an early indication of whether Australia’s fugitive emissions are reducing at a rate that is compatible with net zero by 2050. Concerningly, if all of the current proposals for new mines and expansions proceed to operation, Australia’s coal mine methane emissions could [rise](#) by up to 50% by 2030, locking in higher fugitive emissions over the next two decades.

A high fugitive emissions trajectory appears to be anticipated by the federal government. In its 2022 [emissions projections](#), the federal government indicates that coal mine methane emissions will increase to 2028. Those projections do not appear to anticipate widespread deployment of new or additional mitigation efforts at existing coal mine facilities. Rather, the government predicts that the methane emitted per tonne of coal will **increase** by 4% from 2020 to 2030.

Increased coal production and a lack of widespread deployment of methane mitigation technologies are barriers to effectively reducing Australia’s fugitive methane emissions (representing 11% of Australia’s total greenhouse gas emissions). We urge the CCA to develop a leading indicator that tracks whether coal production and methane mitigation measures are aligned with Australia’s climate targets.

We estimate that coal production should fall from approximately 500 Mt to 200 Mt of coal by 2030 to be aligned with the IEA’s pathway to net zero by 2050, largely [driven by reductions](#) in thermal coal production. The methane intensity of coal production must also fall during this period, through a combination of closing the gassiest coal facilities and the [widespread deployment of mitigation measures at metallurgical coal mines](#).



Considering the significance of coal mine methane as a percentage of Australia’s fugitive emissions, the CCA should seriously consider the following **standalone leading indicators of progress**, to determine whether fugitive emissions are falling fast enough to achieve the transition to net zero by 2050:

- evaluating thermal coal mine productions rates, specifically commitments to expansions compared to phasedowns; and
- assessing the deployment of onsite methane mitigation at existing coal facilities.

Indicators would provide a strong foundation for increased government regulation of coal mine methane, as we advise above. Importantly, it should underpin the creation of a national methane action plan. The IEA canvassed a number of methane action plans in its [2023 regulatory roadmap](#) for driving down coal mine methane emissions.

Ember has previously [investigated](#) the opportunity of rapid coal mine methane reduction for Australia’s overall decarbonisation. We would welcome further consultation with the CCA on this issue.

## 4. Developing a Coal Sector Decarbonisation Pathway

An ambitious coal sector decarbonisation pathway would drive significant methane emissions reductions.

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A previously under-analysed sector of Australia's National Greenhouse Gas Inventory is 'Fugitive Emissions', within which methane represents a key greenhouse gas emitting process. **Ember strongly supports an ambitious coal sector decarbonisation plan.**

We emphasise that tackling coal mine methane is [technically and economically feasible](#) within the next decade (to 2030 to 2035). Rapid coal sector decarbonisation will underpin other sectoral pathways to decarbonisation, namely the electricity sectoral pathway.

There are also opportunities, and commensurate risks, in setting the timeline for Australia's coal sector decarbonisation. A rapid decarbonisation allows more time for harder to abate sectors of the economy to drive down their emissions. Unfortunately, an unambitious coal sector decarbonisation may also [lock in higher emissions](#) to 2040 and beyond, with a number of coal facilities [currently considering](#) whether to expand existing mines or develop greenfield facilities.

We urge the CCA to consider the following factors in advising the government on developing a coal sector decarbonisation pathway:

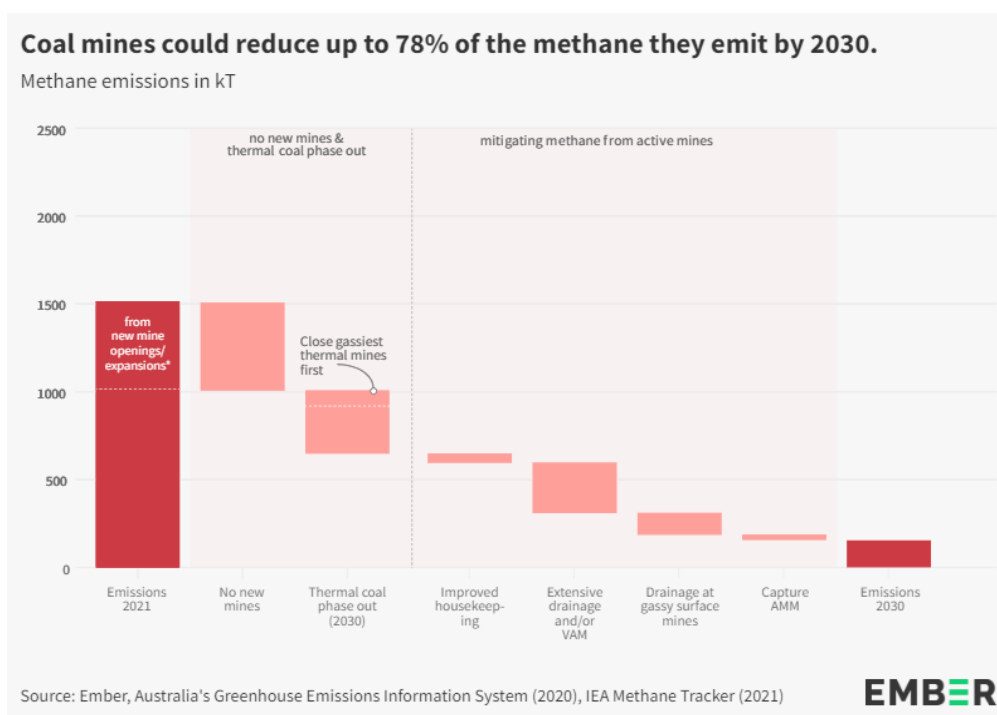
- the difference between technical and economic barriers to decarbonisation. Coal facilities have the [technology and means](#) to [reduce their emissions rapidly](#);
- the comparative economic costs of an ambitious coal sector decarbonisation pathway compared to other high methane industries, such as [agriculture](#); and
- the importance of integrating both onsite mitigation opportunities and a thermal coal phaseout into a coal sector decarbonisation pathway. We have previously [assessed](#) the feasibility of reducing Australia's coal mine methane emissions by at least 78% by 2030 through a combination of measures.

## 5. Phasing Out of Fossil Fuels

An ambitious and sensible fossil fuel production phaseout plan is necessary to meet Australia's climate targets and support our economy during the transition.

Ember **strongly supports** the CCA seriously investigating, consulting on, and ultimately advising the government to establish a fossil fuels production phaseout plan.

A fossil fuel production phaseout plan is a fundamental pillar of tackling coal mine methane emissions, according to our analysis, [Climate Analytics](#) and the [IEA](#). Indeed, we [estimate](#) a phaseout of thermal coal mining by 2030 would reduce Australia's coal mine methane emissions by just under half. Further methane reductions could also be driven by phasing out the gassiest coal mines by 2030 and onsite mitigation at the remaining coal facilities, enabling Australia's coal sector to reduce its methane emissions by 78% by 2030.



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We emphasise that the pace of the energy transitions continues to outstrip modelling, and that it is the responsibility of government to scale up the ambition of the fossil fuel phaseout - aligning with [IEA](#) and [IPCC](#) pathways to maintain 1.5C - and support the Australian public and economy through this transition.

Ember's [Global Electricity Review 2023](#) indicates that 2022 may be the year that power sector emissions peaked, with renewables investment accelerating and the global demand for fossil fuels falling. This aligns with global market forecasts, including [EY's modelling](#) that indicates a 20% drop in coal demand by 2030 and a 70% decrease by 2050. They describe this demand drop as "inevitable" and add that while "demand for coking coal (used in steelmaking) is impacted less than thermal coal (for electricity generation) in the medium term" the overall impact is "similar over the longer term". To similar effect, the federal Department of Industry, Science and Resources [predicts](#) coal prices will fall by up to 75% by 2028, resulting in Australia's annual coal exports falling in value by \$US79 billion by 2028.

The Australian government must be proactive and set an ambitious fossil fuel production phaseout plan that ensures regional communities and the mining sector are resilient throughout this transition process. Communities and workers that rely on fossil fuel production should be supported to transition to renewables and critical minerals industries, to ensure Australia is poised to take full advantage of the [renewables revolution](#). Mining companies should be supported to pivot to net zero aligned resources, notably [critical minerals for a renewable economy](#).

Ember's global team of energy experts are well placed to advise the CCA on the complexities and opportunities of a fossil fuel production phaseout plan. We emphasise that:

- a fossil fuel production phaseout plan is vital for Australia to meaningfully reduce its coal mine methane emissions by 2030-2035. While the burning of coal is a Scope 3 issue, the extraction of coal is a Scope 1 issue that has [significant implications for Australia's capacity to meet its net zero by 2050 commitments](#);
- the importance of global modelling which forecasts falls in coal demand to 2030 and beyond. Ignoring the realities of global coal demand will leave Australia's economy and communities increasingly exposed to volatile markets; and
- the benefits of integrating a fossil fuel production phaseout plan into a coal sector decarbonisation plan and a national methane action plan.

We further recommend that the CCA self-initiate a research program into the challenges and opportunities of a phase out of fossil fuel production (pursuant to s 11(c)-(d) of the *Climate Change Authority Act 2011* (Cth)).

## 6. Strengthening Coal Mine Methane MRV

A priority of the NGER review should be an overhaul of coal mine methane MRV.

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The IEA estimated in its [2023 Methane Tracker](#) that Australia is under-reporting its coal mine methane emissions by 60%. Indeed, this year, the federal government [proposed](#) to increase the State-based emissions factor for Queensland open cut coal mines by 35%, following [independent satellite analysis](#) indicating that the methane intensity of Queensland open cut coal mines is significantly higher than reported.

The Australian government reports that coal mine methane emissions represent approximately 5% of Australia's total greenhouse gas emissions. But, if under-reporting is addressed, coal mine methane may represent up to ~7% of Australia's total greenhouse gas emissions.

The reporting framework for coal mine methane emissions is [outdated and inaccurate](#). Fossil fuel companies (including coal, oil and gas) are able to, pursuant to NGER, report their methane emissions using generic factors rather than directly measuring emissions, by conducting source and site-specific measurement and reconciliation.

According to the [IEA](#), the global under-estimate gap between actual emissions and reported emissions from coal facilities is more significant than the under-estimation gap in agriculture, even though it is [technically and economically feasible](#) to directly measure coal facilities.

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We **strongly urge** the CCA to explicitly investigate, and consult on, all aspects of coal mine methane MRV with a view to overhauling the entire measurement framework for coal facilities reporting under NGER, including the following reforms to NGER:

- the **phaseout of Methods 1 and 2** for open cut coal mines. As we have previously [recommended](#) to the Australian government, Method 1 is an inaccurate methodology that does not take into account the [variability of methane pollution](#) between facilities and across space and time;
- the **implementation of [direct and site-specific measurement standards](#)** that require all coal mines to directly measure their methane through a multi-input model, ensuring that the in-situ methane intensity of coal extraction at a facility is measured, accounting for methane variability and major pollution events;
- the **implementation of direct and site-specific measurement standards for all post-mining and abandoned coal mine facilities**. Mines [continue to leak significant amounts of methane](#) into the atmosphere even decades after mining has stopped;
- **improving the integrity of coal mine methane measurement, reporting and verification**. In particular, exploring the feasibility of [independent verification](#) through aerial flyovers and satellite imagery, and ensuring that reporting methane emissions are publicly available to allow for verification by independent third parties;
- consideration of **reforming the measurement of coal mine waste gas flaring**. The assumption that 98% of methane is combusted when flared may be inaccurate in light of recent [analysis from the USA](#) which indicates the real world flare efficiency is closer to 90%; and
- ensuring clear, transparent and accessible reporting of a facility's methane emissions, the activities undertaken by that facility to mitigate its emissions and the extent of the methane actually destroyed or converted by those measures (that is, the efficiency rate of the mitigation measure).

All coal facility methane emissions, sources and reporting methodologies should be made publicly available by the Clean Energy Regulator for all facilities that report under NGER. We recommend that for all facilities that commence operations after 1 July 2023 (including extensions on existing coal facilities), these reforms should take effect from 1 January 2024. All existing facilities should be phased into direct reporting by 1 January 2026 at the latest.

We emphasise that industry-partnered initiatives, like the [MMP](#), have also developed MRV standards that better reflect best practice and accurate MRV beyond Australian regulations. The MMP's draft MRV standards require coal mines to implement the following measures to meet the Level 5 standard:



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- Site and source-specific measurements taken at an appropriate sampling frequency to achieve the lowest uncertainty in emissions reporting;
  - Complementary total site-level measurements to ensure there is site-level reconciliation with source-specific measurements that are undertaken at an appropriate frequency to achieve the lowest uncertainty in emissions reporting;
  - Site-level measurements should be generated from a multi-input model including sensors mounted on mobile platforms (e.g. drones); and
  - Site-level measurements may also be independently verified with satellite imagery.

The MMP draft standards are equally applicable to the MRV of methane emissions from thermal and metallurgical coal facilities.

The MMP includes industry partners that operate in Australia, and is further evidence that direct measurement standards are technically feasible and emerging industry practice. Outside Australia, comparable jurisdictions are moving to direct measurement of methane standards, including the [European Union](#).

It is critical that Australia's coal mine methane MRV laws are strengthened to ensure accurate reporting as soon as possible. Accurate reporting is an essential precondition for the government to set a sensible coal mine methane decarbonisation pathway and phaseout thermal coal mining in Australia, that is aligned with an ambitious 2035 target. As [noted](#) by the UNECE:

*National monitoring, reporting and verification programmes not only help countries understand the contribution of coal mining to their overall methane and greenhouse gas emissions, but also identify opportunities for mitigation.*

Over the next decade as more [methane satellites go live](#), the opportunity for the government to be at the forefront of both the measurement of coal mine methane, and therefore, setting the agenda for a sensible decarbonisation pathway of the coal sector, is shrinking. We urge the CCA to prioritise coal mine methane MRV to underpin the integrity of both the safeguard mechanism and Australia's legislated climate targets.

Ember has previously [evaluated Australia's coal mine methane MRV laws](#), and will continue to develop analysis and recommendations relating to improved coal mine methane MRV regulation. We would welcome further consultation with the CCA on this issue.

## 7. New Entrants to the Safeguard Mechanism

The CCA should engage with the risks and opportunities that arise from regulating new entrants under the safeguard mechanism.

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While the safeguard mechanism has already been reformed this year, we urge the CCA to incorporate a consideration of new entrants to the safeguard mechanism into its NGER review and advice for the Minister's Annual Climate Change Statement (Statement). The Senate Standing Committee on Environment and Communications Legislation recommended, in its [final report on the Safeguard Mechanism \(Crediting\) Amendment Bill 2022](#), that the Australian government should monitor the impact of new entrants upon the safeguard mechanism and report to Parliament through the Statement.

New coal sector entrants pose particular risks to the integrity of the safeguard mechanism. First, there is [likely significant methane under-estimates](#) that hinders the Australian government from accurately assessing whether a new coal facility will impact upon the safeguard mechanism. Second, the number of proposed new coal facilities and expansions are [likely to strain the safeguard mechanism](#) and increase the pollution managed under the scheme.

Ember's previous research indicates that new expansions and entrants will have a significant, and potentially under-accounted for, impact on the integrity of the safeguard mechanism:

- our [research](#) shows that if all new mines and extensions are approved, Australia's coal mine methane emissions could rise by 50% to 2030;
- we also [estimate](#) that just 15 proposed coal mines could lift methane emissions by one fifth; and
- individual mine Environmental Impact Statements, like [Lake Vermont](#), are significantly under-estimating emissions.

# Supporting information

## Detail of consultation

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This submission was made to the Climate Change Authority's [Issues Paper 2023 - Setting, measuring and achieving Australia's emissions reduction targets](#) and consultation process in June 2023.

## Methodology

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This response was developed from Ember's previous research on the [scale](#) of Australia's coal mine methane emissions, how Australia could deliver [two-thirds of its Global Methane Pledge](#) by tackling this major source of emissions, how [cost effective](#) reducing coal mine methane through the safeguard mechanism would be and why it is essential to reform Australia's national greenhouse and energy reporting scheme to [ensure the accurate measurement of coal mine methane emissions](#).

This analysis is based on data reported to the Clean Energy Regulator in CO<sub>2</sub>-equivalent. To convert to methane emissions, our analysis assumed that 80% of reported CO<sub>2</sub>-e emissions from underground mines are fugitive methane, and 60% of reported CO<sub>2</sub>-e emissions from surface mines are fugitive methane. In practice this will vary from mine to mine and may be higher than assumed.

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