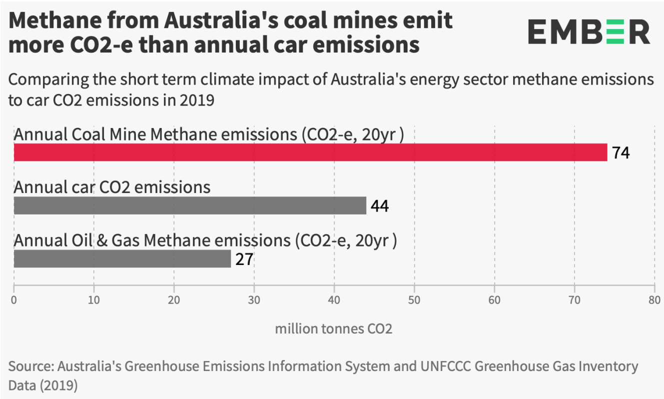
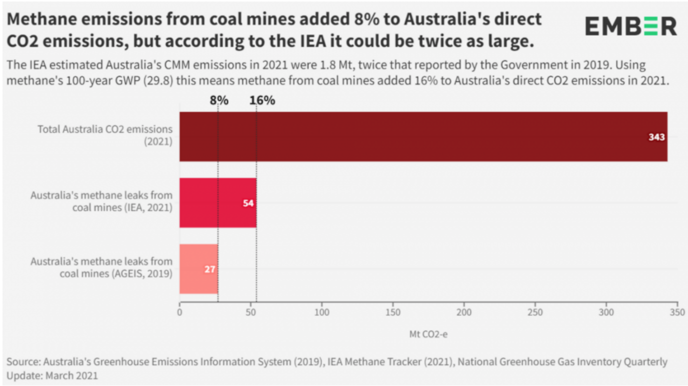
Safeguard Mechanism Consultation - Response for Coal Mine Methane

Contents

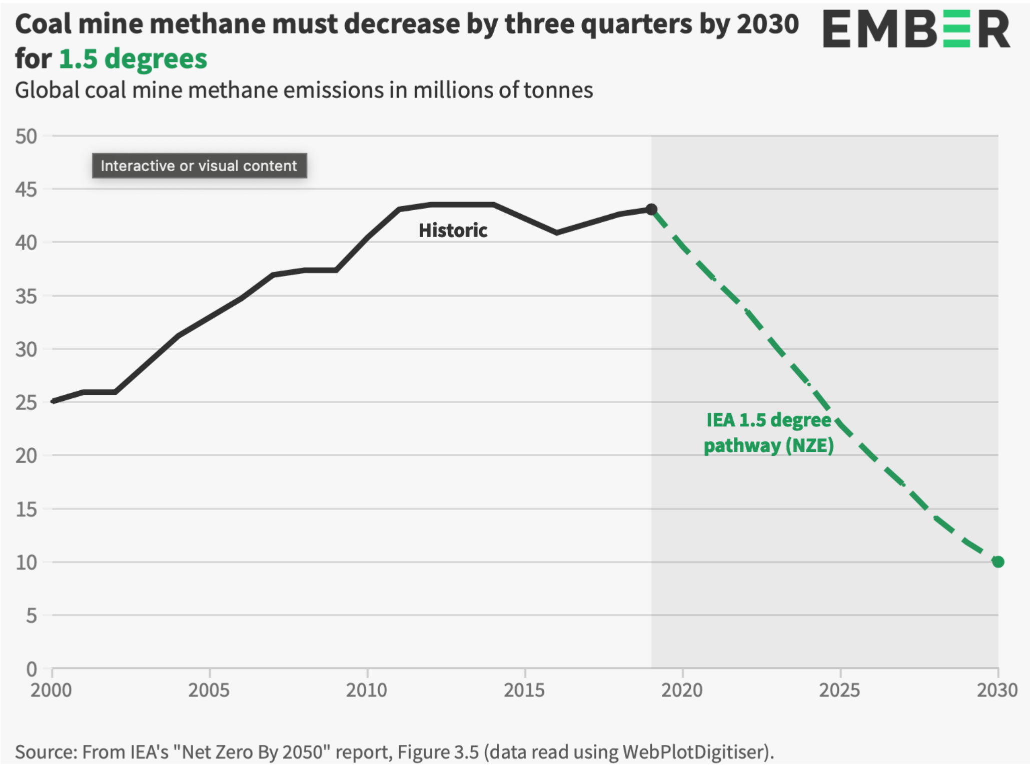
1. Coal Mine Methane Overview

Ember's recent report on Australia's Coal Mine Methane demonstrates the importance of tackling one of the country's biggest causes of global warming.

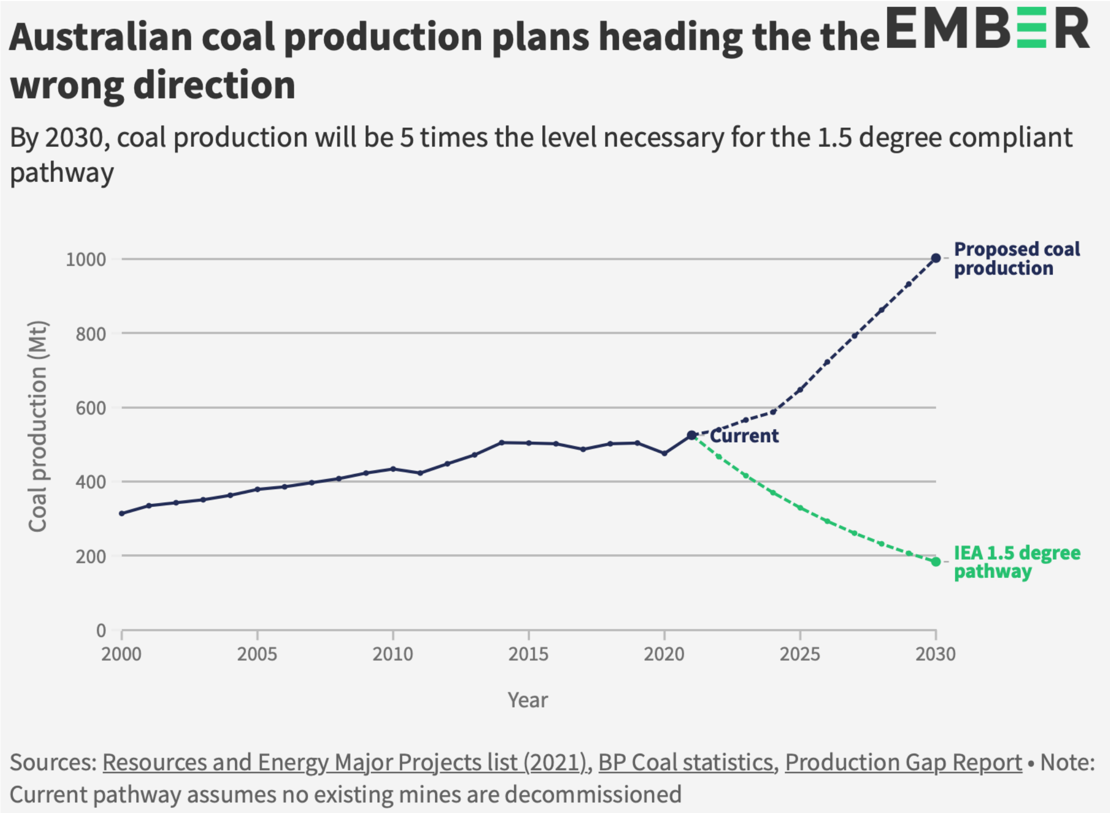




According to the IEA, in order to achieve the 1.5 degree compliant emissions pathway, the global mining industry must reduce its methane emissions by at least 75% by 2030 through a combination of mine closures and increased methane capture and destruction.



At current trends, not only is Australia not reducing its emissions, but is in fact approving new mines that will only increase its methane emissions.



Where does coal mine methane come from?

Thermal Coal:

Thermal coal is used for electricity generation. It typically has a lower methane content than metallurgical coal used in steelmaking, but the world produces far more thermal coal than metallurgical coal.[1]

Ember's position is that Australia must stop producing and consuming coal which is used for electricity generation. Being a developed country with the resources for generating electricity from renewable sources, the costs of externalities associated with the production and consumption of thermal coal far outweigh the very modest economic benefits from electricity generated from thermal coal in Australia.[2]

Metallurgical Coal:

Ember's position is that steel is central in today's civilization and even in the context of climate change, it is a core material behind the decarbonization of the global economy. Steel contributes to the operation of clean energy, mobility, residential and other infrastructure.

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[1] Global coal production is about 7,400 million tonnes of coal equivalent, of which about 1'000 million is metallurgical coal (13.5%). IEA

[2] Even in the background of record high power prices we see today (September 2022).

Steel is predominantly made from blast furnaces that use coking (metallurgical) coal as part of its process. The remainder of steel is made from electric arc furnaces, this requires substantial supplies of scrap metal and has issues regarding quality.

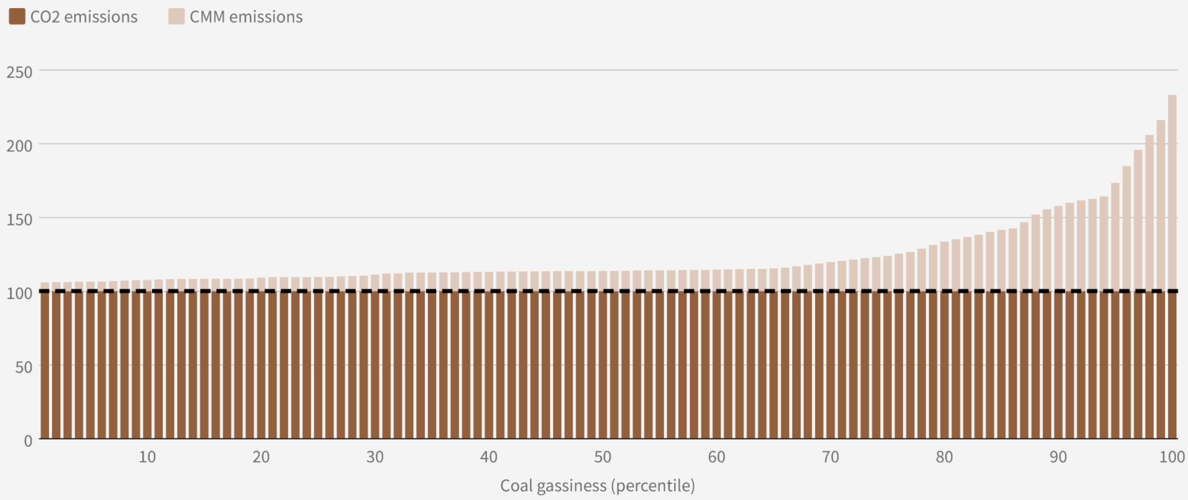
Whilst coal used in blast furnace steel should be replaced with hydrogen, converting the global steel industry is predicted to be slower than phasing out thermal coal and will come at a substantial capital cost of building new steel plants and dismantling old ones.

Ember is very optimistic about these prospects, but the conservative position is that metallurgical coal is a necessary part of the global economy at least until the year 2050.

Metallurgical coal production emits far more methane than normal coal (using IEA estimates this is 12kg per tonne of coal equivalent for metallurgical coal, versus 6kg for thermal coal). As such, the methane contents of the gassiest coal can more than double the greenhouse gas emissions associated with producing a unit of steel.

Steel's GHG footprint strongly dependent on methane content of the coal it uses

Index, 100 = 1.94 tonnes of CO2 (average direct and indirect emissions of one tonne of steel)



Source: IEA World Energy Outlook 2019 (Figure 5.15)
Note: World Energy Outlook covers thermal and metallurgical coalminers

2. The Safeguard Mechanism's goals

In theory, the Safeguard Mechanism can be the solution for achieving needed reductions in Coal Mine Methane in Australia. By capping the methane emissions of Australia's current and proposed coal mines at a level that aligns with the country's climate change goals, it can push the coal mining sector to close (or not open) gassy coal mines, whilst maximising the amount of methane captured and destroyed at its facilities.

An optimally designed safeguard mechanism would incentivize the closure of thermal coal mines through putting a cost on their methane emissions as well as on electricity generated from coal (an issue outside of the scope of this paper).

For metallurgical coal mines, a properly designed safeguard should incentivize them to capture and destroy coal mine methane emissions.

The United Nations Environment Program Global Methane Assessment shows that readily available targeted measures could reduce emissions from the coal sector by 12–25 Mt/yr (i.e. 27-57% of total). From 55% to 98% of these coal sector measures could be implemented at negative or low cost.

We believe that the costs of such projects can easily be borne by the metallurgical coal mines, particularly as metallurgical coal is so much more valuable than thermal coal.

3. Implementation challenges

Lack of data

As shown in Ember's recent report "Tackling Australia's Coal Mine Methane Problem", reported coal mine methane emissions in Australia are underestimated by 30-40%. This is seen by both satellite images of methane emissions from individual mines, as well as by the IEA's analysis.

This is because methane emissions from coal mines are not measured accurately enough and are not required to properly measure their methane emissions through the NGER's scheme. Further details on specific problems and solutions for Underground, Open-cut, and Abandoned mines are discussed in Section 5.

The safeguard mechanism cannot work without accurate, baseline emissions data.

Inadequate Targets

As shown in Australia's Conservation Foundation's report, the coal mines that are covered by the safeguard mechanism have not borne any costs from emitting more methane than their original baselines.

When applying for development permits, mines provide estimates that are far below the actual emissions that result from mining activities.

4. What should the Safeguard Mechanism's share of Australia's climate targets be?

The current situation means that in practice:

The Safeguard Mechanism needs a greater share of the national abatement task than currently proposed (28% of national emissions)

Ember's recent report on coal mine methane emissions in Australia found that the emissions reported are underestimated by 30-40%. Therefore the emissions basis and budget for the Safeguard Mechanism is wrong, and must account for a greater share of the national abatement task.

The coal mining sector should have a faster baseline decline rate

Due to the underestimation of coal mine methane emissions, and methane's strong short term global warming impact (82.5x more than CO2 over 20 years), the coal mining industry should have a faster baseline decline rate.

New coal mines and expansions will jeopardise CER and Australia's climate targets

Our recent analysis found that if only 75% of Australia's proposed mines go ahead, fugitive methane emissions would increase 1.5 times by 2030. That would be 1.5 Mt of methane emitted per year, or 45 Mt of CO2e (100-yr GWP), adding 12% to Australia's total CO2 emissions in 2020.

As mentioned above, methane emissions are currently underestimated so future emissions are likely to be even larger than this.

The Australian Institute estimates that the combustion of coal from these mines will result in an additional 1.35 billion tonnes of CO2 emitted globally. Assuming that Australia continues to export approximately two thirds of its coal production, we calculate that if the proposed mines go ahead, coal production and use in Australia alone will emit approximately 580 million tonnes of CO2e annually by 2030.

This is more than Australia's total current CO2e emissions (529 Mt in 2020).

The United Nations Environmental Programme's Production Gap report estimated that coal output needs to fall by 11% each year to 2030 in order to limit global warming to 1.5°C. However, if Australia's proposed production capacity is realised, the country will by 2030 be producing more than five times the maximum production amount to achieve a 1.5° compliant pathway in 2030.

A vital step in Australia's emissions reduction strategy is to mandate no new coal mines or expansions.

5. Setting baselines for existing and new facilities

Methane emissions are not being properly measured under the NGER's reporting scheme - Setting the original baselines must be done accurately from the beginning

Inaccurate CMM measurement puts at risk the integrity of the budget, and the trajectory to reach and exceed the 43% emissions reduction target.

It will be absolutely necessary to improve current emissions estimates for individual coal mines, as well as abandoned mines, which can only be done by actually measuring methane emissions.

Underground Mines: Satellite data suggests reported emissions underestimated; Oaky North Underground Mine was found to be emitting almost double that of officially reported emissions in 2018 and 2019.

Currently, estimation of methane emissions do not require continuous measurements and current methane monitors are not precise enough to measure methane emissions (they are built to measure methane only for safety purposes). The present monitors will not be able to tell within reasonable uncertainty yearly emissions reductions or increases.

There should be continuous measurements on all drainage and ventilation systems. These should be sensitive enough to measure methane concentrations of at least 100 parts per million (ideally 20 parts per million). See Europe's Methane Regulation for more details.

Open-cut mines: Satellite data showed surface mines can emit significantly more than previously estimated. Earlier this year, Glencore's Hail Creek Open Cut mine in Queensland's Bowen Basin was found to emit 10 times its reported emissions for 4 years consecutively (2018-2021). Since emerging, this satellite data catalysed a review by the Department, and consequent improvements to the inventory resulted in a significant increase in estimated emissions from open cut mines in Queensland (increase of 44% for open cut mines).

Estimating methane from open cut coal mines is done using default emissions factors, which do not capture the variability of each coal deposit. This method is likely to miss "super emitting" coal mines.

Ideally, there should be continuous methane measurements at all open cut coal mines. Otherwise we suggest each coal mine uses its deposit specific emission factor. See the following method proposed by the EU Methane Regulation.

Abandoned mines: Closed Underground mines are required to estimate and report methane emissions annually, until 20 years after closure. Emissions are estimated using default emissions factors, and the mine's last working methane measurement.

Research has shown that if mines are not shuttered responsibly, they can continue emitting methane indefinitely. Gassy mines can still emit around 30% of their initial emissions 20 years after operations have ceased.

Views are sought on the proposal to reset baselines in a way that removes aggregate headroom so crediting and trading can commence when baselines start to decline.

As above, different approaches for metallurgical and thermal coal mines are needed:

Thermal:
The baseline must be set aggressively, to a level of methane leaks of 1-3kg per tonne of coal marketed. CO2 emitted by generating electricity from thermal coal is already a massive pollutant relative to its economic value.

This is the proposed approach of EU's policies for methane reduction in the energy sector, where thermal coal mines are banned from venting or inefficient flaring of methane. [3]

Metallurgical coal:
The EU proposes a less aggressive approach to metallurgical coal, due to its value in modern society. Nevertheless, we'd still propose an approach where the levels of methane emissions are set at a level that incentivises metallurgical coal mines to take steps to reduce methane emissions.

Such values need to be established through careful analysis of the technical and economic details.

What is the preferred approach for setting baselines for existing facilities?

Option 1, which would see all baselines set using industry-average benchmark values

According to the IEA's analysis, the worst performing coal emits as much as 100 times more methane than the least emitting. In Australia, our analysis found that the gassiest quarter of coal mines are responsible for ~70% of Australia's reported CMM emissions.

Targeting the gassiest mines more strongly will result in the fastest and most effective emissions reductions for the industry. Operations which mine gassier coal should be required to implement greater levels of methane mitigation.

[3] Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on methane emissions reduction in the energy sector and amending Regulation (EU) 2019/942

We suggest all coal mines work towards an industry benchmark - coal with a methane emissions intensity of 1-3kgs/tonne. This can be achieved by methane mitigation (see our response to technologies below), or in the case of super emitting mines, closure.

Gassy coal, which cannot reach the industry benchmark of 1-3 kg/tonne even with intense mitigation measures should not be mined. Such super-emitting mines should be responsibly closed (with abandoned mine methane capture).

Setting baselines for new facilities?

All new coal mines are in opposition to both national, and international climate and coal phase out objectives (see response 1.).

However, if new facilities are approved, they should be planned and permitted only if the mine can adhere to the industry best-practice benchmark.

As suggested above, these are coal mines with a methane emissions intensity of 1-3 kg/tonne.

6. Taking account of available and emerging technologies

Should multi-year monitoring periods be extended to allow facilities with limited near-term abatement opportunities to manage their own abatement path?

<u>There are easy to implement technologies already available to mitigate coal mine methane</u>

Coal mine methane can be mitigated through a number of low-cost, readily available technologies. These should be deployed on all coal mines and driven by decreasing baselines. There is no large need for additional technology funding outside of this scheme.

Underground mines: Should improve their methane drainage. Simple improvements to existing drainage (better borehole seals, optimising suction and purity control etc) and additional investment in existing gas drainage infrastructure will significantly reduce methane emissions. This is the most cost effective methane mitigation at mines, improving the mines' operations, as well as worker safety. Generally the captured methane can be used to generate electricity, and is economically beneficial to the mine.

Underground mines also have the option to implement VAM reduction technologies. VAM accounts for ~70% of CMM emissions.

Surface mines: Should implement pre and post drainage (as above).

In depth information of best-practise drainage and VAM at coal mines can be found in this UNECE report.

7. Crediting and trading, domestic offsets and international units

Should banking and borrowing arrangements be implemented for Safeguard Mechanism Credits?

Ember rejects the suggestion that "inter-temporal" arrangements should be implemented for the coal mining industry.

For coal mines, such mechanisms are notoriously difficult to design and implement, as they can easily be gamed by market participants.

It doesn't make sense to allow coal companies to bank credits, or to delay emissions reductions, as methane's global warming potential is most powerful in the short term.

To the extent that SCM credits are issued, a discount factor should be applied to those from coal mining (and indeed all fossil fuels - as legacy industries - versus 'future' or 'ongoing' industries - which can be more rewarded for enduring emissions reductions.

8. Other policy issues

Global Warming Potential of Methane should be the 20-year GWP

Global Warming Potential (GWP) is a measure to express the effects of GHGs in CO_2 equivalent terms. Given that CH_4 absorbs much more energy when in the atmosphere, but has a shorter lifetime than CO_2, the IPCC considers its impact over 20 years (GWP = 82.5x more than CO_2) and over 100 years (GWP = 29.8x).

Historically, the 100-year value has been used by governments and in major international agreements on the basis that global warming is a long term challenge.

We suggest using the 20-year GWP. Climate change is an emergency, and the next 20 years are critical with regards to climate action. Methane's short atmospheric lifetime means emissions reductions can reduce global heating in the near term.

EU Methane Regulation bans venting and flaring at coal mines to reduce emissions

Examples of the proposed regulation:

"Venting and flaring of methane from drainage stations shall be prohibited except in the case of an emergency, a malfunction or where unavoidable and strictly necessary for maintenance."

"Venting of methane through ventilation shafts in coal mines emitting more than 0.5 tonnes of methane/kilotonne of coal mined, other than coking coal mines, shall be prohibited"

For the full text see the Regulation of the European Parliament and of the Council.

About Ember

Ember is an energy think tank that is focused on accelerating the global transition to fossil-free electricity.

Its team and board of energy experts across Europe and Asia have worked in utilities including RWE, E.ON, Shell and BP.