

6 August 2026

To: Climate Change Authority

Re: Consultation on Fossil methane: A near-term abatement opportunity

Thank you for the opportunity for the Institute for Energy Economics and Financial Analysis (IEEFA) to provide input to the Climate Change Authority – Consultation on Fossil Methane.

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.

Australia ranks among the world's largest exporters of fossil fuels, including coal and LNG. Production of these is associated with fugitive methane emissions, released via leakage, venting, and flaring in oil and gas extraction and in coal production before, during and after mining. In all, Australia emits about 30MtCO₂e of this short-lived but high global warming potential gas a year.

The Safeguard Mechanism is Australia's primary emissions reduction lever to manage large-scale emitters. Fossil fuel producers account for 86% of methane emissions managed under the Safeguard. Without improvements to the way fugitive methane is measured and managed, Australia and key states will struggle to meet their emissions reduction targets.

IEEFA's key recommendations include:

Q1. Requirements to strengthen the management of closed mines, particularly underground mines that are placed in care and maintenance or have temporarily ceased production, as they keep on emitting and do not receive mine closure and sealing treatment.

Q2. Policy settings need to be strengthened and broadened to create strong incentives for methane emission abatement in Australia's fossil fuel sector. This year, the federal Safeguard Mechanism will be reviewed while new coalmine regulations were introduced in NSW. However, the limited scope of these policies/reviews is expected to limit their effectiveness to drive change.

Q3. Methane abatement technologies and practices are commercially available and economically attractive. However, further development is required to commercialise lower cost and more expansive abatement activity.

Q4. The recent Safeguard reforms have been ineffective in driving new methane abatement in the fossil fuel sector. Coal and gas producers continue to prioritise growth over abatement so there is more work to do to incentivise material abatement activities.

Q5. Coal and oil and gas account for 68% of all offsetting in the Safeguard Mechanism. Offsets prevent or at least discourage onsite abatement; they are unconstrained, and as their price is low funding available for real abatement remains underutilised.

Q6. Ventilation air methane (VAM) abatement is a commercially available and technically proven technology in operation across the globe. A number of VAM abatement projects have been launched in Australia, via matched grant funding. IEEFA estimates about half of the high-emitting active mines could be amenable to VAM abatement while others have insufficient remaining mine lives to achieve returns on the capital investment required.

Q7. Further evidence of potential methane under-reporting in open-cut coalmines was published this year, validating IEEFA's earlier findings. Improving methane measurement is a necessary step to improving both financial incentives for abatement and the efficacy of regulatory regimes intended to drive methane emissions reductions.

Q8. Practical and additional policy measures for consideration should include: scrutinising new coal and gas developments, expanded regulation and creating urgency through pricing signals.

Q9. Specific targets should be set for methane and carbon dioxide emissions reduction to drive change. Current targets bundle methane and carbon dioxide emissions together, and is driving change on neither.

Kind regards,

Andrew Gorringe, Energy Finance Analyst – Australian Coal, IEEFA

Joshua Runciman, Lead Analyst – Australian Gas, IEEFA

Question 1

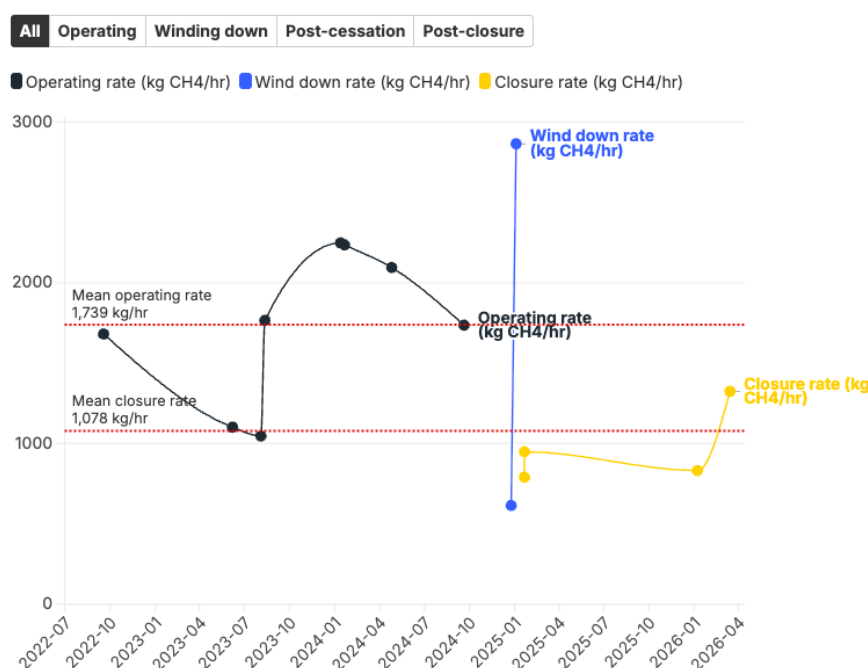
In IEEFA's view, current policies and measures are not sufficient to cover emissions from decommissioned and abandoned mines.

Active coalmines that produce more than 100,000 tonnes of CO₂e are captured in the Safeguard Mechanism. When these mines are idled or closed, coverage lapses once reporting falls below that threshold – even though methane continues to vent.

[Carbon Mapper](#) satellite observations of Tahmoor Colliery in NSW, which entered care and maintenance in December 2024, show methane plume emissions persisting at about 60% of the operating rate – a 40% reduction, not the effective cessation implied by “closure” (Figure 1). Care and maintenance, not full closure, is the most common way Australian underground mines exit production, potentially remaining unsealed and unflooded, awaiting a restart decision.

Unfortunately, government policy in this area is informed by methane studies in mines that are completely closed and sealed. That's not the case in care and maintenance.

Figure 1: Methane plume observation trend at Tahmoor Colliery



Source: pre-closure emissions from [GEM Table M1](#). Post-closure data from [Carbon Mapper](#).

Under the proposed [Carbon Credits and Other Legislation Amendment \(Integrity and Transparency\) Bill](#), a facility owner's responsibility would be removed on deregistration – when placed in administration. But Clean Energy Regulator (CER) deregistration does not extinguish the physical emissions liability.

IEEFA recommends that where a corporation is deregistered, the CER is required to either nominate an alternative responsible entity to continue reporting, or report the facility's ongoing emissions itself.

Question 2

In IEEFA's view, current policy settings are not sufficient to create strong incentives for methane emission abatement in Australia's fossil fuel sector. A key driver is likely underreporting of methane emissions. The International Energy Agency (IEA) [estimates](#) Australia's fossil fuel methane emissions are underreported by more than 86%, which weakens both the Safeguard Mechanism's coverage and the financial incentive to abate.

Safeguard Mechanism

The Safeguard Mechanism appears to have had a negligible impact on methane emissions from Australia's coal and gas sectors: covered methane GHG emissions [increased](#) (to 2023) and fell only 1.7% to 21.4MtCO₂e in FY2024–25, according to [Safeguard data](#) for coalmining and oil and gas extraction.

Coverage itself is incomplete — about 80% of coalmine methane sits within the Safeguard Mechanism, but gas sector coverage is below 40%, largely because many gas facilities fall below the reporting threshold, such as for smaller gas plants and transmission pipelines. IEEFA's analysis identifies further shortcomings:

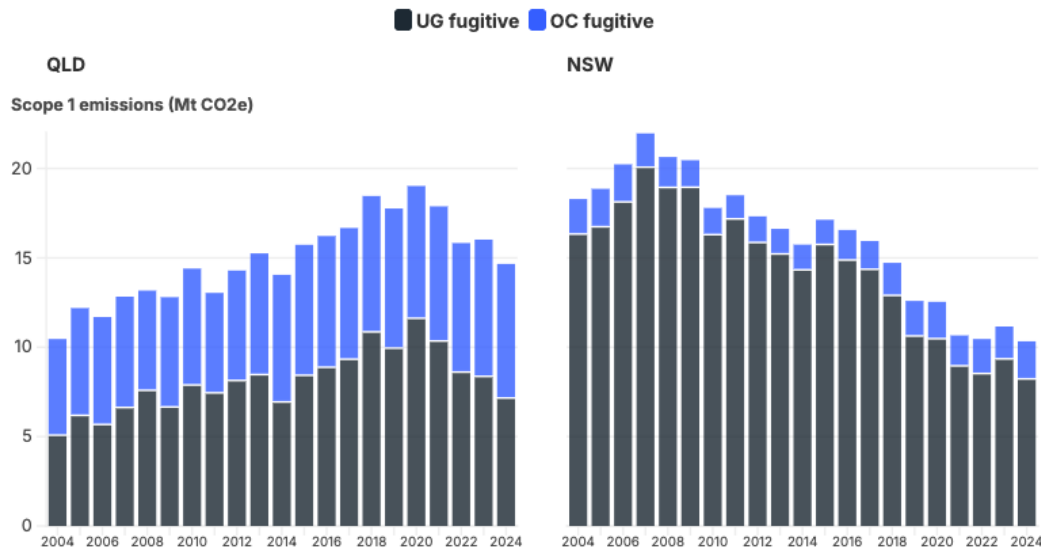
- **Underreporting excludes** some facilities altogether.
- **Baselines and reduction rates** may factor in underreporting of methane emissions.
- **Underreporting weakens financial incentives for abatement** (emitters cannot properly value the [financial benefits of captured methane](#)).
- **Underground mines** face a disproportionate baseline decline rate (above the standard 4.9%) because baselines are averaged across open-cut and underground types. This inequity worsens as baseline setting shifts towards a 50/50 facility-specific/industry-average split by 2030.

Coal sector

Coalmining methane emissions are declining in Queensland and have been for nearly two decades in NSW — but this reflects mine closures, not abatement (Figure 2).



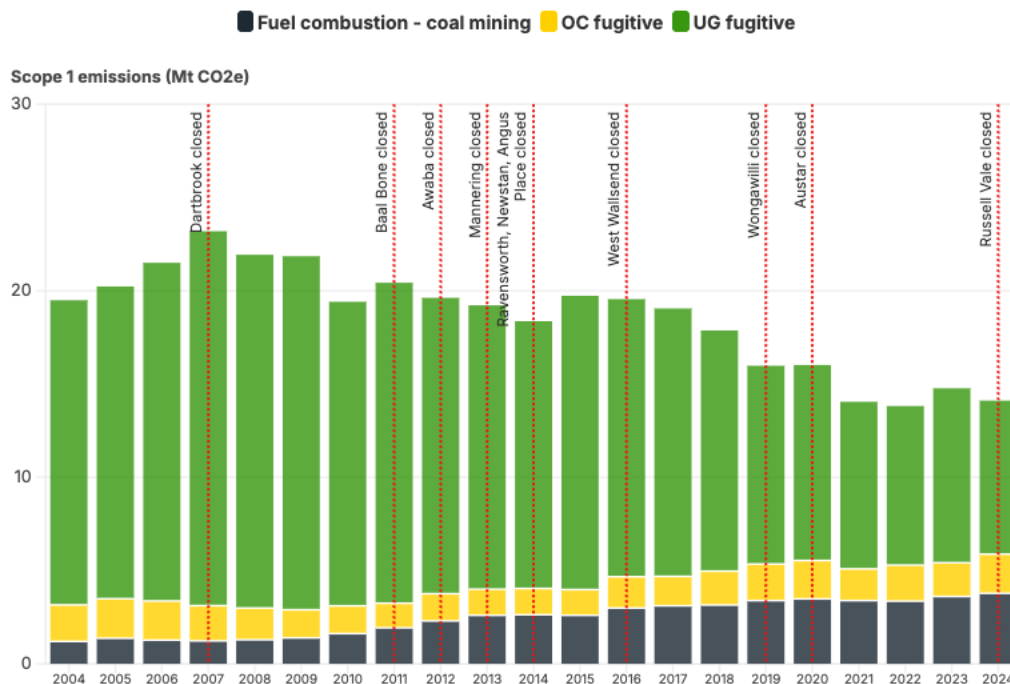
Figure 2: Coalmining methane emissions trend by state



Source: United Nations Paris Agreement inventory 2004–2024.

In NSW, Scope 1 emissions fell 28% from 2004 to 14.1MtCO₂e in 2024, tracking a string of underground mine closures (Figure 3). At least 12 mines have closed since the 2007 peak, partly offset by new underground mines opening (Narrabri, Moolarben and, from July 2026, Maxwell).

Figure 3: NSW coalmining emissions trend, including underground mine closures



Source: National Greenhouse Accounts, filtered for NSW Coal, company announcements and reporting.

Emissions from remaining operating mines continue to grow. NSW's EPA [Greenhouse Gas Mitigation Guide](#), phasing in 2027–2034, is the strongest state instrument in Australia, but its exemptions are so broad that only three large active mines (Appin, Mandalong and Maxwell) fall within its scope (Figure 4). Most others are either exempt (Western Coalfields) or scheduled to close before the guide takes effect.

Figure 4: NSW EPA policy guidelines exclude most mines



Source: [2024-25 Safeguard data](#), [Coalmining in NSW: Key Statistics](#), IEEFA. Note: Bubble size = methane emissions; Excludes the undeveloped Wallarah 2 Coal Project. The Maxwell underground mine assumes 75% methane content in annual Scope 1 emissions estimate of 0.37MtCO_{2e}, as per the [project GHG assessment](#).

Gas sector

Queensland's approach — restricting methane flaring and venting only where “technically or commercially infeasible” — falls short of best practice. [IEEFA previously recommended](#) the state government set explicit limits and justification requirements, as done in some US states ([North Dakota](#) and [Texas](#)).

Queensland has no equivalent to the NSW EPA's guide, and its resources sector emissions reduction plan has been [postponed](#) from 2025 until up to 2030. At a minimum, Queensland should adopt similar measures to international or NSW jurisdictions.

Question 3

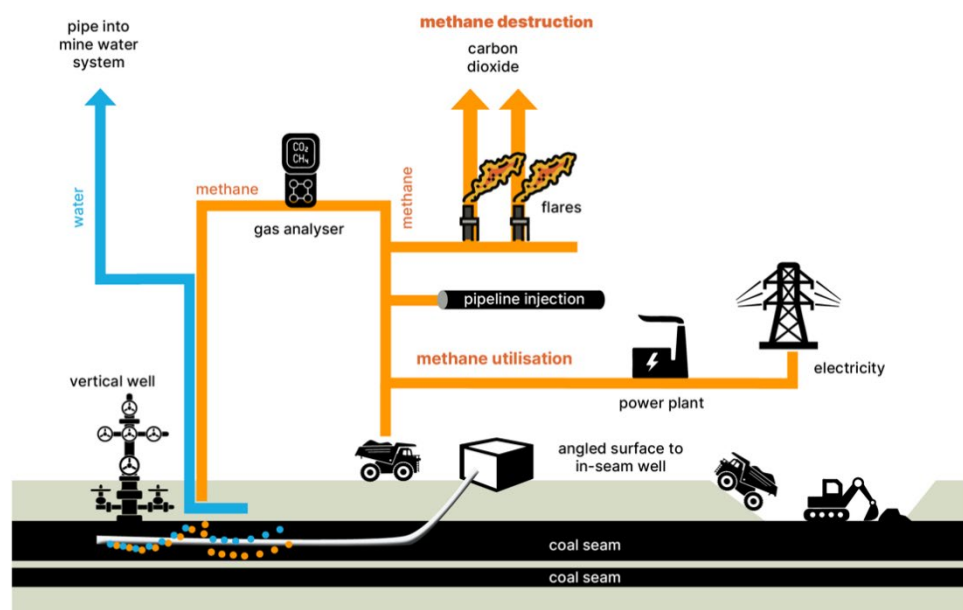
Coal sector

Commercially available methane abatement methods include pre-drainage (with flaring or utilisation of the captured gas), increased post-mining “goaf gas” capture, improved mine and borehole sealing, and VAM abatement.

Pre-drainage

Pre-drainage is suited to both open-cut and underground mines, extracting methane before mining via surface-to-inseam (or underground, cheaper underground-to-inseam) wells (Figure 5). However, it is rarely performed in open-cut mining today, although fields with high gas content and good permeability offer a genuine opportunity to pre-drain before drill-and-blast, subject to practical barriers including interaction with active mining areas and uncertainty over achievable production rates.

Figure 5: Pre-mining gas drainage and utilisation



Source: Glencore Fact Sheet Methane Emissions, IEEFA

IEEFA

However, in open-cut mines, methane abatement is rarely performed. Nonetheless, in coal fields with high methane content and good gas permeability, there is an opportunity in open-cut mining to pre-drain the gas from the coal seam prior to the drill and blast activity.

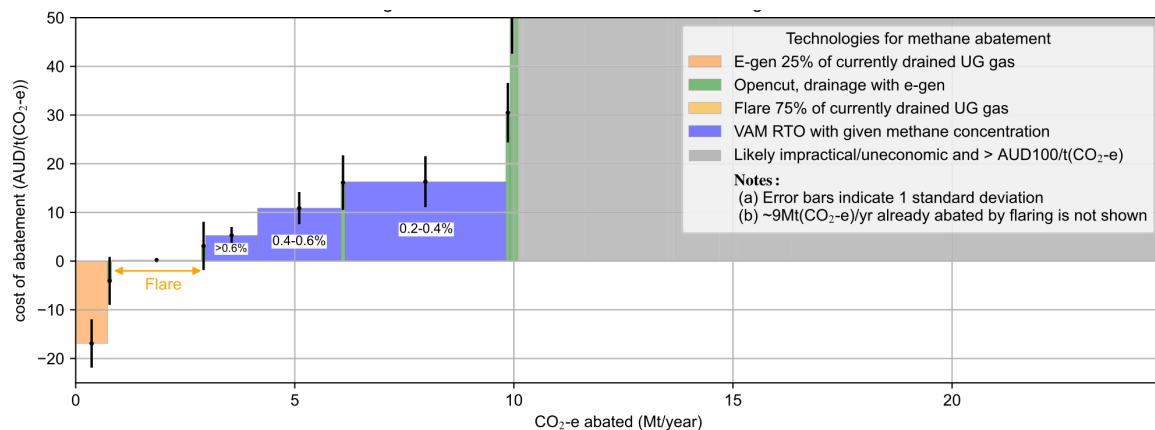
VAM abatement

VAM abatement processes the large, low-concentration air volumes vented from underground mines, as per the United Nations Economic Commission for Europe’s [best-practice guidance](#).

[CSIRO’s Techno-economic assessment](#) finds Australia’s coal fugitive marginal abatement cost curve (MACC) has about 6MtCO₂e a year that can be abated for less than AU\$11 (±4) a tonne —

3.1Mt of it by VAM abatement at underground mines, and 2.8Mt by flaring or generating power from gas already being drained for safety (Figure 6).

Figure 6: Australian coalmine fugitive emissions – marginal abatement cost curve (MACC)



Source: CSIRO Techno-economic assessment of coal fugitive methane abatement in Australia using available technology.

CSIRO estimates the remaining 15MtCO₂e per year of fugitive methane — almost all from open-cut mines — would cost more than AU\$100/tCO₂e to abate. IEEFA considers this potentially overstated: if the IEA's underreporting estimate is attributed to open-cut mines, true methane volumes there are 2–3x higher, which would lower abatement cost to perhaps AU\$35–\$50 per tonne. Where abatement is uneconomic, the case shifts to technology development and constraining mining production.

Gas sector

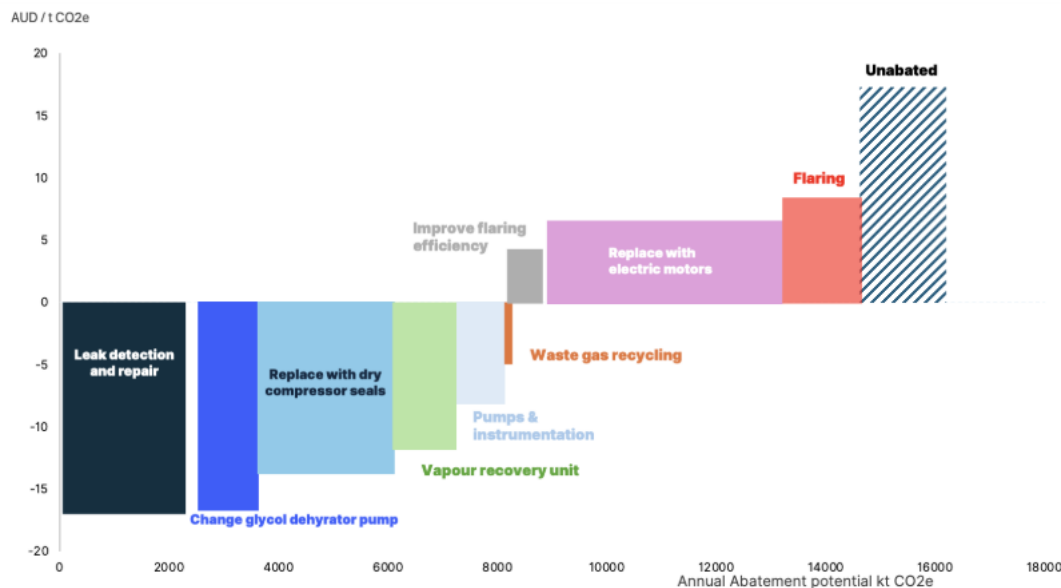
Approaches for abating gas sector methane emissions [include](#):

- Implementing leak detection and repair regimes.
- Replacing high-emitting equipment with new low loss alternatives.
- Prohibiting venting, and restricting flaring to emergencies.
- Recycling waste gas.
- Installing electric equipment to replace gas-driven alternatives.

About 90% of Australia's gas sector methane is abatable with commercially available technologies (Figure 7). About half of these options have negative cost; the remainder are below AU\$250/tonne of methane, equivalent to about AU\$4.50 gigajoule or less than AU\$10/tCO₂e (Figure 7).



Figure 7: MACC, Australia oil and gas sector



Source. IEEFA. [Prioritising methane abatement makes economic sense](#). December 2024. Page 28.

Question 4

The spot ACCU price (AU\$38) or the regulatory cost-containment price (AU\$82.68) implies destroying a tonne of methane is often cheaper than buying an offset to cover it.

The federal Department of Climate Change Energy and Water's [National Inventory report 2024](#) notes that in coalmining, the flaring of pre-drainage gas, and technologies to recover and utilise coalmine waste gas for electricity generation have been increasingly adopted in underground mining, particularly since 2009. Coalmine waste gas to electricity projects became eligible for large-scale generation certificates under the Renewable Energy Target (RET) scheme in 2011 and the ACCU scheme from 2015.

Despite incentivising methane utilisation at most major underground coalmines, this year the government closed the Coal Mine Waste Gas (CMWG) method to new projects. The method expired in March 2025, and the federal government cited "[declining marginal value](#)" for not reinstating it. The data contradicts that reasoning: 11 new CMWG projects registered in FY2024–25 — the highest uptake in the method's history, more than double the next highest year.

IEEFA is not aware of any new gas utilisation abatement projects built outside the CMWG method — the new 5MW CMWG power station at Centurion mine is an existing ACCU project.

Major Australian gas and LNG producers have taken [early steps](#) on methane abatement, including portable flares to reduce venting or changing processes to flare gas instead of venting, trialling gas capture technologies, replacing seals in gas transmission and processing infrastructure, and leak repair. However, methane reporting shows material scope remains, reflecting that producers continue to [prioritise growth over abatement](#). The Safeguard

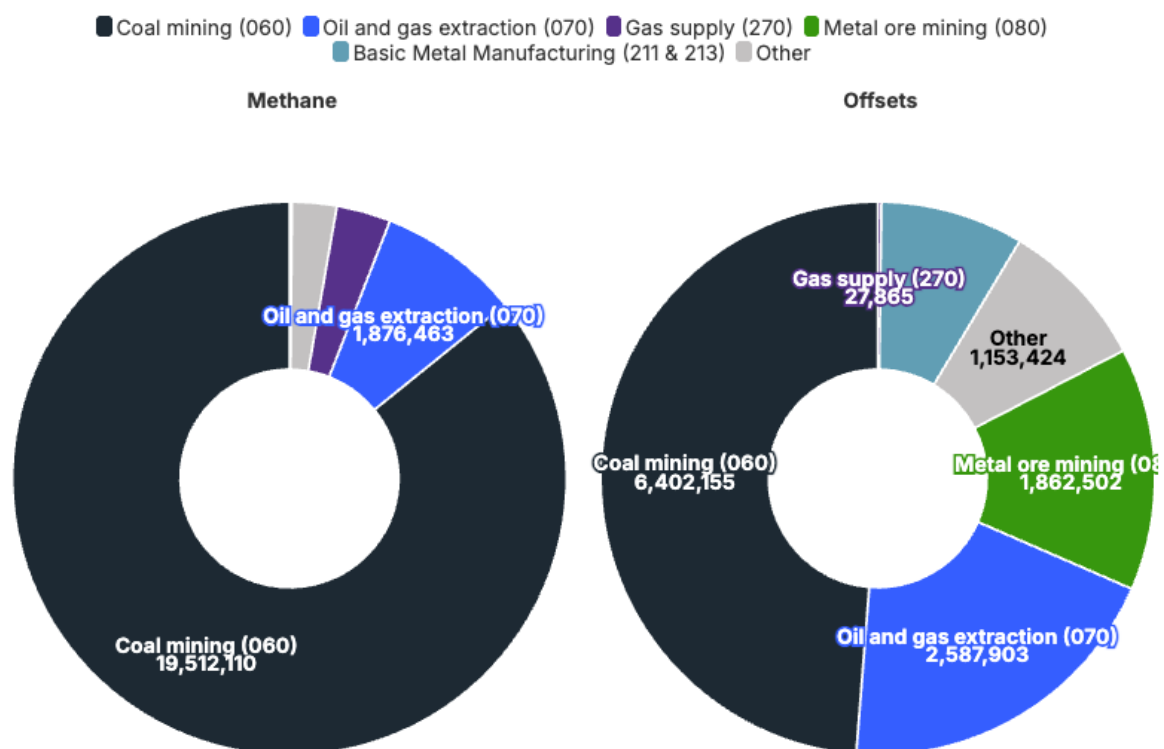
Mechanism reforms improve reporting transparency but alone will not lift the Mechanism's ability to drive decarbonisation if the other issues raised in this submission are not addressed.

Question 5

The availability of uncapped carbon credit offsetting to meet net emissions requirements under the Safeguard Mechanism is a key barrier to actual methane emissions abatement, for three reasons: the fossil fuel sector dominates the use of offsets, low ACCU prices and available abatement funding is going largely unspent.

Coalmining and oil and gas production dominate Safeguard methane emissions (86% and 8%, respectively, Figure 8)

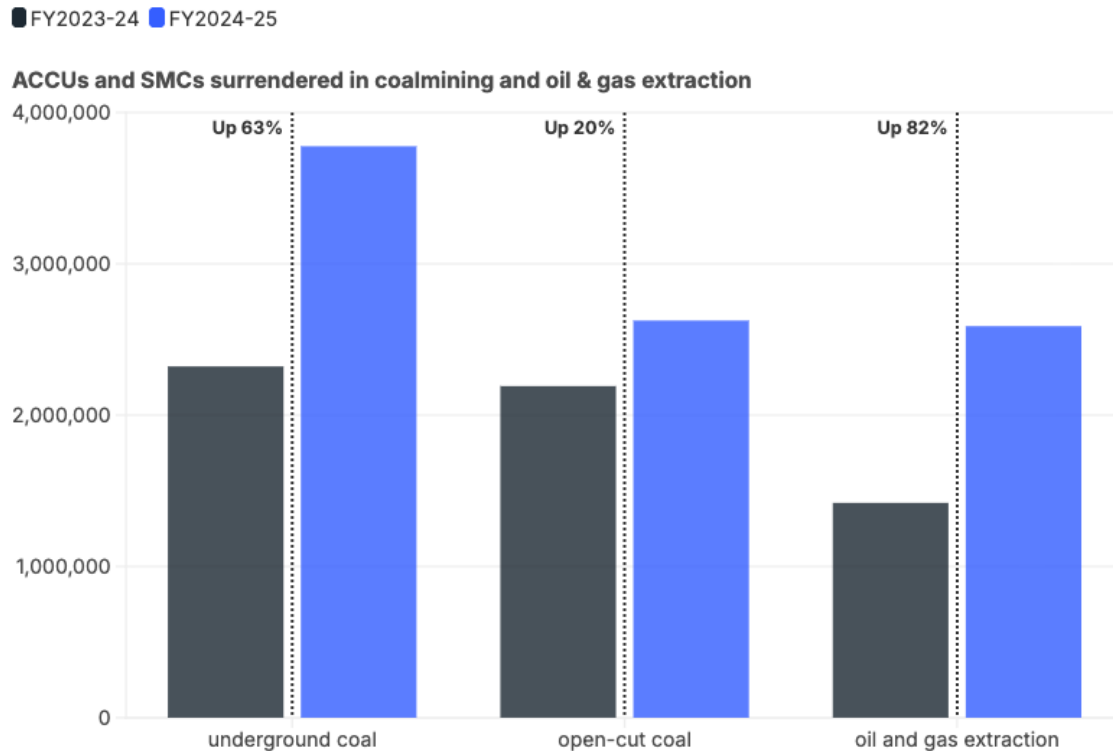
Figure 8: Fossil fuel production dominates Safeguard methane and offset use



Source: CER FY 2024-25 data • Offsets = SMC surrendered plus ACCU surrendered.

Together, they account for 6.4Mt and 2.6Mt of offsets (ACCU and SMCs surrendered, respectively) or 68% of total Safeguard offset use, which grew 52% in FY2024–25 alone (42% in coal, 82% in oil and gas; Figure 9)

Figure 9: Fossil fuel production offsets grew by 52% in one year

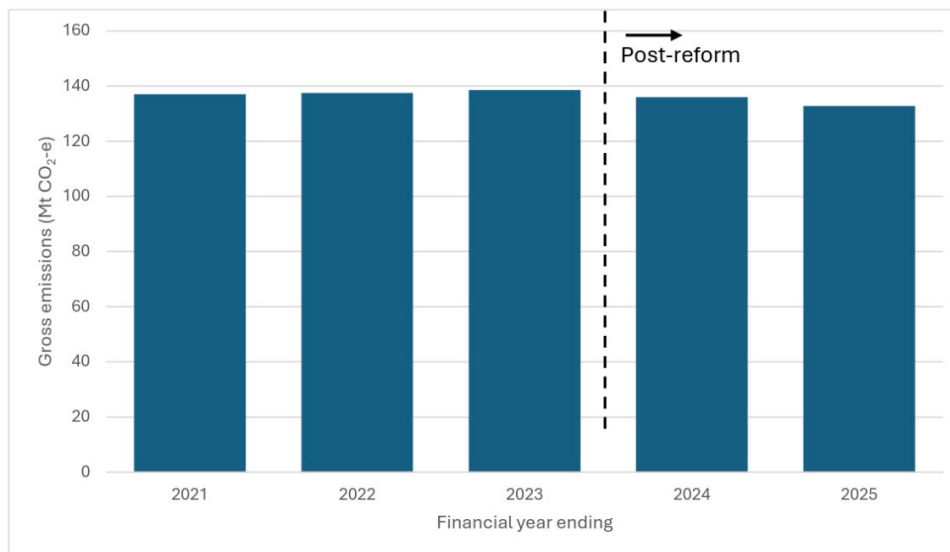


Source: CER; Coal mining (060), Oil and Gas extraction (070) • Note: open-cut coal includes combined open-cut and underground facilities

Underground mines drive this growth in coalmining, a trend IEEFA expects to continue, given they face steeper baseline decline rates than open cut.

Recent license extension applications illustrate the pattern, and contain no firm commitment to onsite abatement — only commitment to monitor carefully, and fall back on offsets — consistent with Australia's gross Safeguard emissions failing to decline overall (Figure 10).

Figure 10: Gross Safeguard emissions pre and post reforms, 2021–2025, all sectors



Source: CER (2026c).

Offset (ACCU) pricing

On pricing, IEEFA [estimated](#) 67% of fossil fuel methane could be abated for less than AU\$30/tCO₂e.

In coal, much abatement is cheaper than the ACCU price yet is not being taken up; in oil and gas 90% are at no net cost overall. IEEFA estimated the AU\$120 million cost of using offsets to meet Safeguard obligations was a [tiny fraction](#) of the sector's AU\$92 billion LNG export revenue (FY2021-22).

Two structural factors help explain the limitations of relying only on MACC curves: they disguise considerable upfront capital costs, and with short or uncertain asset lives, operators favour offsets over investment.

Funding for emissions reductions including methane abatement

More than AU\$1 billion in government decarbonisation funding remains largely unspent, across a [range of schemes](#). Environmental, social and governance (ESG) capital must compete with other corporate capital allocations — a risk that might be growing as major diversified miners with ESG reporting obligations are increasingly selling mines to smaller, unlisted, private equity-backed or offshore owners who may not carry equivalent disclosure or abatement ambitions.

In the gas sector, abatement costs and benefits are small relative to revenue and profits, with returns (while likely positive) [lower than other investment opportunities](#). As JP Morgan [noted](#), “despite the positive economics of abatement in many instances, barriers to action may include a lack of awareness of the problem, low-quality emissions data, capability gaps, infrastructure constraints, and relative profitability compared to other uses of capital”.

These are barriers that are unlikely to shift without stronger policy measures.

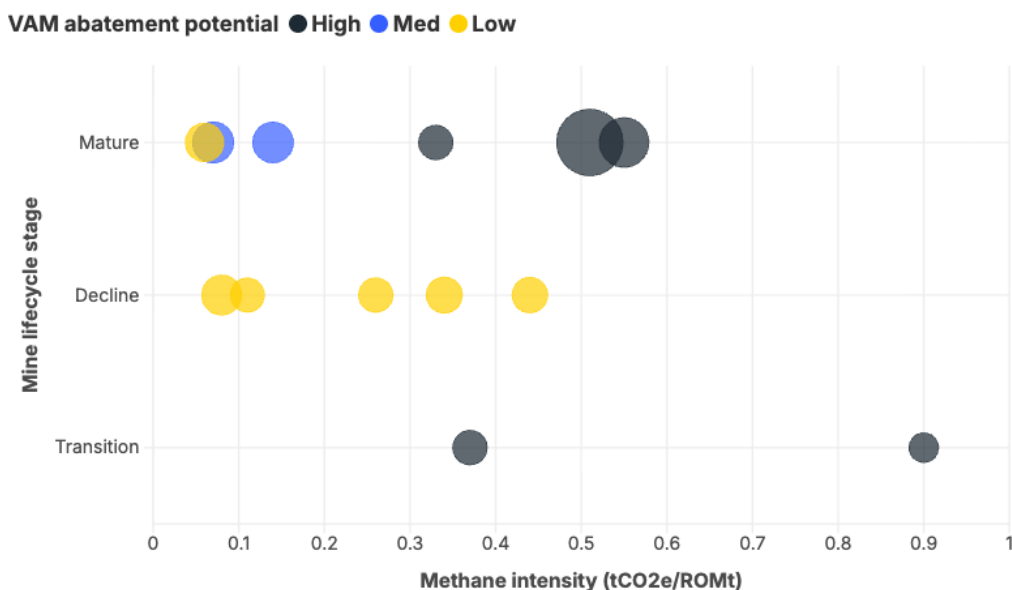
Question 6

VAM abatement is commercially available and technically proven internationally. Australian projects are under way at the Kestrel (Queensland) and Appin (NSW) mines, both via matched grant funding,

Kestrel's commercial-scale VAM abatement project, reported the full capital cost of regenerative thermal oxidation (RTO), before funding, was as low as AU\$9.24/tCO₂e or about AU\$15/t over 10 years.

For mines with high methane emissions and long remaining lives, VAM abatement is a strong commercial proposition. Without grant funding or for mines facing with uncertain or short lives, achieving acceptable returns is harder. Figure 11 illustrates the potential across the top 12 highest-emitting underground mines for VAM abatement — considering the mine lifecycle stage and the mine's methane volumes. The illustrative example indicates about half of them could have medium to high VAM potential while others are already in decline and scheduled to close in the short to medium term.

Figure 11: Illustrative VAM abatement potential in Australian underground coalmines



Source: CER FY 2024-25 reported fugitive methane intensity, company reports.

Question 7

Australia's fossil fuel sector [reported](#) methane emissions of 30.22Mt in 2024, but significant underreporting is likely.

The [NSW Net Zero Commission](#) has acknowledged for open-cut mines “studies have suggested their fugitive emissions may be underreported” — a material gap given open-cut methods produce 75% of Australia's coal.

The Method 2 sampling review for open-cut coal methane estimation — recommended as a [“matter of urgency”](#) by the Climate Change Authority in 2023 — remains unresolved 2½ years later.

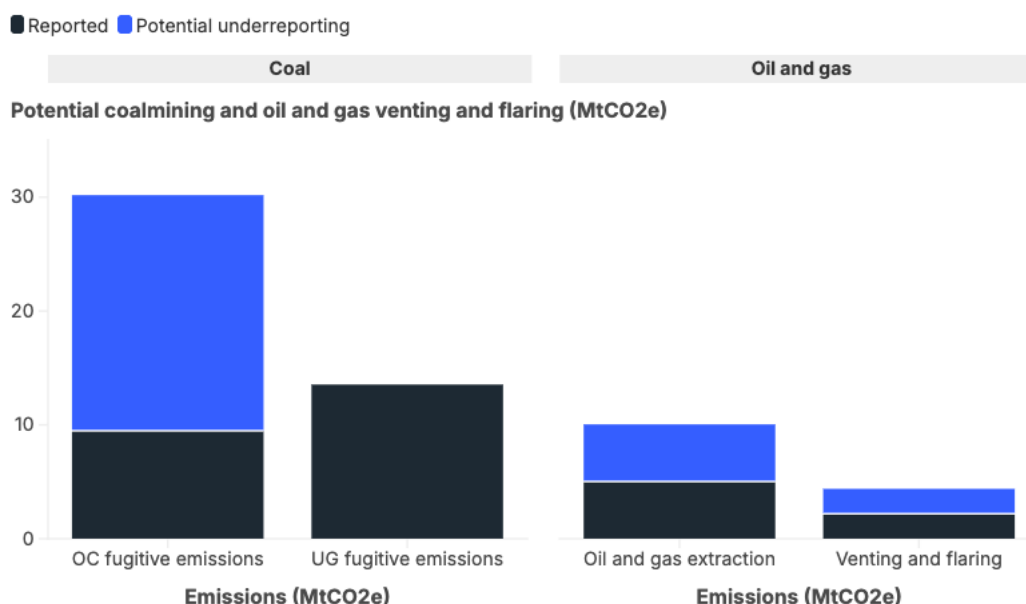
The IEA estimated [Australia’s coalmine methane emissions](#) at 1.657Mt (46.4MtCO₂e) for 2024, 80% above United Nations’ reported 0.918Mt (or 25.7MtCO₂e) — a gap of 20.7MtCO₂e.

Applying that gap to open-cut mines specifically (reported open-cut fugitive emissions: 9.48MtCO₂e) implies a true total near 30MtCO₂e, about 3x the reported figure — consistent with IEEFA’s [earlier estimates of 3x](#). A recent UNSW airborne study of [the Bowen Basin](#) corroborates this pattern — underground mines reconciled to within 8% of bottom-up reported totals but open-cut mines were underestimated by 3.6x.

The [UN reported](#) methane emissions from Australian oil and gas extraction of 7.2MtCO₂e in 2024, including extraction and venting and flaring. IEEFA estimates true emissions are roughly double that.

Combined, official fossil fuel methane emissions of 30.2MtCO₂e likely sits alongside a further 27MtCO₂e of underreported emissions (Figure 12).

Figure 12: Total estimated methane emissions from fossil fuel production



Note: IEEFA estimates Oil and gas production methane emissions are about twice reported level.
Oil & Gas Sector(s): 1.B.2.a Oil, 1.B.2.b Natural Gas, 1.B.2.c Venting and Flaring

Sources: National Emissions Inventory, IEEFA estimates.

Australia is not alone. [Europe is also struggling](#) with underreporting of methane from open-pit coalmines.

Underreporting undermines both the financial incentives and the regulatory efficacy of abatement policy across coal and gas production. IEEFA [recommends](#):

- Removing oil and gas operators' ability to use "lower-order" estimation methods
- Mandating "higher-order" methods based on direct measurement and independent verification
- Developing top-down monitoring and verification methods
- Accelerating the NSW Hunter methane monitoring pilot, expanding it to other coal regions.

Improving measurement is a necessary precondition for both stronger financial incentives and more effective regulation.

Question 8

[Additional policy measures](#) could drive methane reductions beyond current settings, such as:

- For coal and gas developments, require detailed feasibility studies of methane and other GHG abatement in approval applications, with approval conditional on comprehensive methane management plans.
- Make best-practice equipment and processes and leak repair mandatory in the gas sector.
- Require VAM abatement and enhanced drainage in the coal sector.
- Limit venting and flaring in oil and gas production.
- Apply more stringent regulation to post-operating emissions.
- Amend the Safeguard Mechanism to strengthen price signals.
- Limit or penalise excess offsetting
- Facilitate access to generate carbon credits for methane abatement activities
- Consider new financial mechanisms, such as a methane tax.
- Provide financial support for early adopters and to for post-operation emissions.

The IEA's [Driving Down Coal Mine Methane Emissions](#) roadmap frames these as four regulatory approaches — information requirements, prescriptive requirements, outcome-based policies, and economic instruments. Australia's approach has partial coverage across each, with more work to do — most urgently on information requirements, given the measurement issues raised in Question 7.

Question 9

Uncontrolled fugitive methane is a risk to national and state emissions reduction targets. Combined with likely underreporting, stalled abatement progress compounds these risks. IEEFA considers a better approach would be to set separate targets for methane and carbon dioxide reductions, rather than a single combined target. [Climate Resources](#) compared historical energy sector methane emissions against +1.6°C and +1.8°C global warming pathways, which implied a reduction of 94% and 75% by 2035, respectively.

Separate gas-specific targets would have two benefits. First, current policy (including the Safeguard Mechanism) bundles methane with diesel-sourced CO₂ in a single baseline, which obscures progress on either gas. It also leaves real abatement stuck in a "technical readiness" debate over measures such as VAM abatement, methane pre-drainage or electric equipment, while instruments such as the Diesel Fuel Tax Credit and Safeguard baseline effectively lock-in existing technology. Second, a methane-specific target would constrain the supply of eligible methane offsets, possibly raising prices and better incentivising abatement.