



Environmental
Defenders Office

Plugging the Leaks: Mapping Methane Regulation in Queensland

July 2024

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www.edo.org.au

For further information on this report, please contact:

Revel Pointon
Managing Lawyer
Southern and Central Queensland
T: [1800 626 239](tel:1800626239)
E: revel.pointon@edo.org.au

Briana Collins
Solicitor
Human Rights and Coal
T: [1800 626 239](tel:1800626239)
E: briana.collins@edo.org.au

Authorised by Revel Pointon, 3/28 Donkin St, West End, Qld.

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I. Executive Summary

Methane is a more potent greenhouse gas than carbon dioxide, with a shorter lifespan, a combination of factors that makes immediate reduction of methane emissions essential to slowing global warming immediately. In Australia, 40% of methane emissions derive from the energy sector.¹² In coal, gas, and oil, they are caused by venting, flaring and fugitive emissions via leakages.

As for Queensland, the crux of the problem is easily diagnosable. Nearly 50% of Australia's fugitive methane emissions are derived from Queensland coal mines. Nearly 97% of Queensland's coal mine methane emissions come from the Bowen Basin.³ After coal, the Queensland gas industry also plays a significant role, contributing 7% to Australian-wide fugitive methane emissions.⁴

Despite the depth of Queensland's methane footprint, the Environmental Defenders Office (**EDO**) has reviewed relevant laws and their application and found that most methane emissions are not regulated under state law. Queensland regulations of emissions from the mining industry particularly are patchy and designed predominantly for worker safety and immediate-vicinity human health. While these are critical focuses, without reform, the current framework is ill-suited to a climate change context. Laws that do explicitly regulate *environmental* harm in Queensland, such as the *Environmental Protection Act 1994 (Qld)* (**EP Act**), provide powers that could be deployed to regulate methane emissions, such as via implementation of environmental authority (**EA**) conditions, but in practice, are not.

Nor do federal laws have sufficient scope to monitor, regulate and enforce methane mitigation. While the federal emissions reduction scheme in the *National Greenhouse and Energy Reporting Act 2007 (Cth)* (**NGER Act**)'s Safeguard Mechanism has some potential to guide emissions reduction in the energy sector, its tangible impact – especially related to methane - will be limited due to uncapped access to offsets in the form of Australian Carbon Credit Units (**ACCUs**) to achieve targets. In order to ensure that fossil fuel facilities seize the low-hanging fruit of methane mitigation, Queensland laws should be reformed to direct the implementation of best practice technologies and tools to achieve real emissions reduction.

The *Mineral Resources Act 1989 (Qld)* (**MR Act**) and EP Act, as Queensland's mainstay legislation for regulating mining,⁵ are already set up for smooth implementation of the necessary reforms *only* insofar as they improve the total quality of life, both now and in the future, and in a way that maintains the ecological processes on which life depends.⁶ As the USA, Canada, China, Europe, and the UK race to plug the leaks with a mixture of regulatory measures to reduce methane emissions, it is only a matter of time until Australia, and Queensland in particular, is identified as an international laggard. That can be avoided by implementation of the recommended reforms.

¹ International Energy Agency, Global Methane Tracker 2024. Accessed at: <https://www.iea.org/data-and-statistics/data-tools/methane-tracker> (**IEA Methane Tracker**).

² This report does not deal with emissions from other sectors such as agriculture.

³ ERI, Fossil Methane Report, 11.

⁴ ERI, Fossil Methane Report, 11.

⁵ MR Act, s2(a).

⁶ EP Act, s 3.

II. Overriding recommendation:

Refuse all new and any expansion of coal and gas environmental authorities.

We wish to make clear at the outset of this report that to the extent we make recommendations as to emissions mitigation at the site of new projects, we do so reluctantly as a secondary and inferior pathway that the science clearly shows irresponsibly diminishes the chances of achieving less than 1.5°C of global warming.

The scientific consensus is that net-zero emissions must be achieved by 2050 to make possible the stabilisation of global warming at 1.5°C. The pathway to 1.5°C has no place for new coal and gas projects.⁷ Aligned with science, we must insist that the Government approve no new coal or gas projects in Queensland as our primary submission.

Regarding methane in particular, this report makes clear that there are no solutions capable of completely neutralising the danger that methane emissions present to the climate and the human rights of Queenslanders. Development proposals which pose that danger for whatever reason, including lack of feasibility of emissions abatement technology, are not justifiable limits on human rights. Any economic benefits felt by peoples– will be grossly outweighed by the social and environmental consequences of exacerbated climate change.

The Queensland Land Court decision in *Waratah Coal Pty Ltd v Youth Verdict Ltd (No 6)* [2022] QLC 21 saw President Kingham recommend refusal of the Galilee Coal Project on grounds including unjustifiable limitation of the human rights contained in the *Human Rights Act 2019 (Qld)*. We recommend close consideration of the President’s findings in this judgment, including those related to human rights, and, that the President was not able to be satisfied that the emissions from the mine would be substituted by those of a hypothetical supplier, were it refused.

We submit that approving new coal and gas projects, including extensions, would unjustifiably limit human rights for reasons like those set out in that judgment. On this basis, the Department of Environment, Science, and Innovation (**DESI**) has both the discretionary power available to it and proper justification to refuse such projects.

⁷ International Energy Agency, “Net Zero by 2050: a Roadmap for the Global Energy Sector”, October 2021. Accessed at: <https://www.iea.org/reports/net-zero-by-2050> (**IEA Roadmap**).

III. Summary of recommendations

Appreciating the shifting nature of the legal framework relating to methane at the federal level and current technological challenges, EDO makes recommendations in two tranches.

Recommendations (i) and (ii) should be implemented immediately and do not require legislative amendments, recognising the urgency of the methane problem and the opportunities arising from available solutions.

Recommendations (iii)-(viii) should be prepared for immediately, for implementation as soon as possible.

The recommendations apply equally to the coal, gas and oil industries unless specified.

(i) Draft new standard conditions requiring fossil fuel projects to mitigate methane emissions.

These conditions should apply to any new and existing environmental authorities, where relevant, and include binding greenhouse gas emissions abatement plans, emissions limits, monitoring and reporting requirements, publication of data, best practice technology implementation and robust leak detection and repair standards.

(ii) Create a framework for decision making aligned with Queensland's climate change targets via creation of an Environmental Protection Policy (Greenhouse Gas Emissions).

(iii) Update assessment criteria for coal mine approvals to include risk assessment of fugitive emissions intensity and capacity to abate.

These changes should be supported by reference to the greenhouse gas emissions reduction targets in the *Clean Economy Jobs Act 2024* (Qld) and the recommended Environmental Protection Policy (Greenhouse Gas Emissions) above.

(iv) Resource the Departmental civil enforcement team to enforce new and existing conditions that regulate methane.

(v) Commission an independent working group for periodic review of best practice standards required for mitigating emissions.

(vi) Provide staged regulation leading to a ban of venting and flaring except in emergencies.

These changes should include banning non-emergency venting at oil and gas sites, restricting non-emergency flaring at oil and gas sites, banning venting from drainage sites at coal mines, and resourcing work groups to plan a roll out of state-wide Ventilation Air Methane technologies and pre-drainage at open cut coal mines.

(vii) Ensure that management of mines in care and maintenance and rehabilitation of closing coal mines, gas sites and oil wells minimises risk of abandoned-site methane.

This recommendation requires ongoing methane monitoring at abandoned sites and sites in care and maintenance as a condition of Progressive Rehabilitation and Closure Plans and Residual Risk Assessments, introduction of Progressive Rehabilitation and Closure Plans as requirements for oil and gas environmental authority applications, and working with the Mine Rehabilitation Commissioner and Petroleum and Gas Inspectorate to audit all coal mines in care and maintenance and abandoned oil and gas wells for methane seepages and leakages.

(viii) Introduce a fee per tonne of methane emissions released.

IV. Sources of Queensland's methane problem

Most of Queensland's fossil methane emissions derive from coal mining associated activities, followed by gas production associated activities.⁸ This mirrors Australian trends, which in 2019 saw 68% of Australia's energy-related methane emissions coming from coal mines.⁹ Addressing coal mine methane and gas production is therefore unavoidable to substantially reduce Queensland's methane footprint, and offsets are not the solution, as discussed below.

i. Where Queensland's fossil methane comes from provides context for the legislative reforms required.

Coal associated methane derives from both open cut and underground mining.

Open cut mine methane seeps from pits as coal seams are broken up and coal is extracted for processing and can continue to seep after mining.¹⁰ Smaller amounts of methane occur from post-mining activities (handling, processing and transportation).¹¹ Open cut coal mines can also be pre-drained, although this is not common practice.¹²

Underground mine methane arises from:¹³

- pre-drainage, which is required for worker safety due to the explosive risk of methane;
- Ventilation Air Methane (**VAM**), which is a process of flushing methane out of underground tunnels with air throughout the lifetime of the project to maintain an ongoing safe atmosphere;¹⁴
- post-mining methane (handling, processing and transportation); and
- abandoned mine methane leakages.

Gas and oil production associated methane arises from:¹⁵

- leaking and malfunctioning equipment;
- normal operation of emissions-intensive equipment such as compressors or pneumatic devices;
- intentional release of associated gas not intended for sale.

The quantity of methane that is emitted from each of these processes across the energy sector depends on the fugitive emissions management of operators, or lack thereof. For example, vented

⁸ ERI, Fossil Methane Report, 10.

⁹ Ember, Tackling Australia's Coal Mine Methane Problem, 2022, 4. Accessed at: <https://ember-climate.org/insights/research/tackling-australias-coal-mine-methane-problem/> (**Ember, Australia's Coal Mine Methane Report**).

¹⁰ Ember, Australia's Coal Mine Methane Report, 2022, 9.

¹¹ Ember, Australia's Coal Mine Methane Report, 2022, 8-9.

¹² Ember, Australia's coal mines can deliver two thirds of methane cuts, 2022, 10. Accessed at: <https://ember-climate.org/app/uploads/2022/10/Report-Australias-coal-mines-can-deliver-two-thirds-of-methane-cuts.pdf> (**Ember, Australian Methane Cuts Report**).

¹³ Ember, Australia's Coal Mine Methane Report, 2022, 9.

¹⁴ Intergovernmental Panel on Climate Change, 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, 2019, 4.11. Accessed at: <https://www.ipcc.ch/report/2019-refinement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories/>.

¹⁵ International Energy Agency, Curtailing Methane Emissions from Fossil Fuel Operations: Pathways to a 75% Cut by 2030, 2022, 25. Accessed at: <https://www.iea.org/reports/curtailing-methane-emissions-from-fossil-fuel-operations> (**IEA, Methane Pathways Report**).

emissions are unabated emissions, whereas flaring methane has the effect of converting it to carbon and water vapour,¹⁶ resulting in lower emissions due to carbon dioxide's lower global warming potential in the short term. While VAM has too low a methane content to effectively flare, its impacts can be reduced by passing it through a flameless oxidiser for a similar effect to flaring.¹⁷ Methane can also be utilised onsite or sold as a byproduct, which can supplement the need for other sources of energy to run operations and therefore reduce overall emissions.¹⁸

Effective Queensland methane regulation must address all the major sources of methane with the goal to transition the highest emitting sources to the lowest emitting alternatives as efficiently as possible, without reliance on offsets.

ii. Offsets are not the solution where fast abatement is needed.

Methane and carbon dioxide are different greenhouse gases with critically different characteristics, but carbon credits treat them the same, flattening their different global warming potential with conversion factors, but making no other distinction. Australia's carbon trading scheme credits, ACCUs, are calculated to represent a tonne of carbon dioxide equivalent using a global warming potential over 100 years (**GWP100**), based on the global warming potential of carbon dioxide (1 tonne of carbon dioxide has a GWMP100 of 1). The danger of methane emissions, and potential mitigation opportunity of reducing them is obscured by using GWP100 because its dangerous warming potential is far higher in the short term. While the GWP100 for methane is equivalent to 28 to 36 tonnes of carbon dioxide over 100 years, it is equivalent to over 80 tonnes of carbon dioxide when measured over 20 years.¹⁹

Hence, it is estimated that methane alone has been responsible for roughly one third of the global warming experienced to date.²⁰ **To illustrate, if available means are used to cut global methane emissions by half by the end of this decade, the rate of warming being experienced now could be slowed by 30%, keeping the window open to prevent temperatures rise above 1.5 or 2 degrees.**

This has a practical impact on the effectiveness of climate change policy that attempts to incorporate reliance on offsets as a legitimate and equivalent form of methane emissions reduction as mitigation or onsite abatement.

The surrender of one ACCU is not equivalent to the mitigation of one tonne of methane emissions. **It does not account for the cost of the loss of opportunity to slow the immediate effects of global warming that mitigation of methane has.** The legitimisation of the use of offsets in Queensland methane regulation would proliferate the illusion of emissions reduction equivalent to mitigation while actual emissions increase, a result that will balance the books but be felt by Queenslanders in loss of life, health, and connection to culture.

It is for these reasons that our recommendations to the government will not support the use of offsets as a tool for methane emissions reduction in Queensland.

¹⁶ NSW Environmental Protection Authority, Flaring of Gas Factsheet, 1. Accessed at: [Gas flaring fact sheet \(nsw.gov.au\)](https://www.epa.nsw.gov.au/gas-flaring-fact-sheet).

¹⁷ Ember, Australia's Coal Mine Methane Report, 32.

¹⁸ IEA Methane Tracker, 29.

¹⁹ IEA Methane Tracker 2021, Methane and Climate Change. Accessed: <https://www.iea.org/reports/methane-tracker-2021/methane-and-climate-change>.

²⁰ United Nations Environment Program, Methane emissions are driving climate change. Here's how to reduce them, May 2021. Accessed: <https://www.unep.org/news-and-stories/story/methane-emissions-are-driving-climate-change-heres-how-reduce-them>.

The following section provides an overview of the existing regulation in Queensland, which is currently fragmented and ill-equipped to systematically manage fossil methane emissions.

V. Existing regulation of methane in Queensland

There is minimal regulation of fossil methane emissions in Queensland, and existing legislation does not in practice lead to placing a proactive requirement on proponents to reduce methane emissions.

There are no legislated environmental monitoring requirements for methane emissions from coal and gas mining in Queensland apart from onsite monitoring for safety. Any monitoring data for methane emissions that is collected by coal and gas mine operators is not required to be provided to DES as part of their EA conditions.

While there are some regulations, such as provisions for flaring and venting, and measurement of gasses, these are focused predominantly on reducing risks to health and safety of mine workers without provision for environmental harm. They also largely allow operators to self-assess their compliance and leave little space for regulator enforcement.

As a result, coal, gas and oil producers in Queensland are essentially unlimited in their ability to emit methane into the atmosphere, which has contributed to Queensland having the largest share of fugitive methane emissions in Australia.²¹

i. Environmental authority assessment

The primary legislation responsible for protecting the environment in Queensland is the EP Act, which has an object to protect Queensland's environment while allowing for ecologically sustainable development, that is, "development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends".²²

In addition to mining or petroleum leases, coal and gas mines must apply for an EA to operate, which is assessed by DESI. While DESI must consider the object and standard criteria of the EP Act (including the precautionary principle and intergenerational equity) when assessing EA applications, there is no specific requirement under either the EP Act or the *Environmental Protection (Air) Policy 2019* to consider potential methane or any other greenhouse gas emissions and their associated impacts when deciding whether to approve an EA application for coal or gas mining. This is an important omission given that methane intensity can vary greatly depending on several factors. Coal mining-related fugitive methane emissions, for example, can depend on coal rank, seam, depth, method of mining and location.²³

The defined "environmentally relevant activities" (**ERA**) in the EP Act related to coal and gas mining each mandate a list of "standard conditions" that must form a part of any EA for those projects.²⁴ However, the standard conditions to date do not include provision for methane emissions. As such,

²¹ Queensland Government, Fugitive emissions sector greenhouse gas emissions, State of the Environment Report 2020. Accessed at: <https://www.stateoftheenvironment.des.qld.gov.au/pollution/greenhouse-gas-emissions/fugitive-emissions-sector-greenhouse-gas-emissions>.

²² EP Act s 3.

²³ Intergovernmental Panel on Climate Change, Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories, 130. Accessed at: <https://www.ipcc.ch/publication/good-practice-guidance-and-uncertainty-management-in-national-greenhouse-gas-inventories/> (**IPCC, Good Practice Management**).

²⁴ EP Act, Chapter 5A, Part 1.

whether conditions regulating methane will be imposed on a particular project is left to the discretion of DESI on a case-by-case basis. The limitations of this approach are discussed below.

ii. Environmental authority conditioning

During the application process for an EA, DESI can impose conditions other than the standard conditions to avoid, minimise or manage environmental harm. However, in practice this has not occurred with respect to regulation of the methane emissions of a particular project. A review of all coal and gas mining EAs granted from 1 January 2023 to 5 September 2023, at **Annexure A**, revealed that there were no EA conditions imposed specifically requiring the monitoring and mitigation of methane emissions.

Nonetheless, some imposed conditions could be capable of regulating methane emissions, depending on their interpretation. For example, a condition of some coal mining EAs requires the holder of an EA to plan and conduct activities on site to prevent any potential or actual release of a hazardous contaminant, where the legislated definition of “hazardous contaminant” could arguably include methane on the basis that its improper management is likely to cause serious or material environmental harm through contributions to greenhouse gas emissions.²⁵

Similarly, a regular condition in petroleum and gas EAs prevents the release of emissions that may cause material or serious environmental harm from the petroleum activities, unless expressly permitted by the EA.²⁶

In some cases, conditions expressly state that fugitive emissions are to be managed in accordance with “management plans” without requiring approval of such management plans or even provision of the plans to an authority.²⁷ For instance, the EA for the Hail Creek Open Cut Coal Mine requires fugitive emissions to be managed in accordance with a Tailings Management Plan. EDO recently discovered via inquiry to the public register that DESI is not in possession of that plan, making it impossible for them to assess whether fugitive emissions at Hail Creek are being managed pursuant to its EA.²⁸

In summary, the problem with the way commonly imposed conditions regulate methane emissions is currently twofold: (1) conditions lack specific application to methane; and (2) conditions that could arguably regulate methane are rarely enforced or audited.

EDO is concerned that this practice is continuing with **Whitehaven** Coal’s Winchester South Open Cut coal mine, despite growing recognition of the danger of unregulated methane emissions. The only condition drafted by the Coordinator-General capable of addressing methane emissions requires a GHG emissions abatement plan to be developed post approval but provides no detailed prescription or approval process for this plan.²⁹ If other conditions to address methane are not imposed, Whitehaven will have little incentive to mitigate methane onsite, and the federal Safeguard Mechanism, discussed below, will not necessarily encourage onsite abatement either. This is already evidenced in Whitehaven’s assertion that pre-mine drainage to mitigate methane

²⁵ EP Act, Schedule 4.

²⁶ See, for example, EPPG00652513 at Annexure A.

²⁷ See, for example, EPML00661913 for the Hail Creek Coal Mine, Condition C3(c).

²⁸ Email from Public Register to Briana Collins, 23 April 2024.

²⁹ Coordinator-General, ‘Winchester South project: Coordinator-General’s evaluation report on the environmental impact statement’ (November 2023) Appendix 1 Stated conditions, condition B15. Accessed at: <https://eisdocs.dsdip.qld.gov.au/Winchester%20South/CGER/winchester-south-project-cger.PDF>.

emissions is not “feasible”, providing little justification.³⁰ These omissions leave unregulated approximately 450, 000 tonnes of methane emissions from the proposed project until 2050.³¹

iii. Flaring and venting restrictions

One of the major sources of methane emissions from coal and gas mining is through flaring and venting. Flaring is the ignition of gas, and venting is the release of unignited gas. There is limited regulation of flaring and venting from coal and gas mining under the *Mineral Resources Act 1989* (Qld) (**MR Act**) and the *Petroleum and Gas (Production and Safety) Act 2004* (Qld) (**PGPS Act**).

The holder of a mining lease can only mine coal seam gas, which consists primarily of methane, in certain situations.³² Any coal seam gas that is mined by the holder of a mining lease can be beneficially used, processed or supplied to another entity.³³ However, when it is not commercially or technically feasible to use this methane, then it is permitted to be flared. It is also permitted to be vented when it is not safe to use or flare the methane, or when flaring is not technically practicable.³⁴ These provisions apply to both open cut and underground coal mining.

The holder of a petroleum lease is also similarly permitted to flare methane when it is not commercially or technically feasible to use it, and to vent it, when it is not safe to use or flare the methane, or when flaring is not technically practicable.³⁵

There is no limit to the amount of methane that can be released from coal and gas mining through flaring or venting under these provisions. Operators also do not need a permit to flare or vent, and do not need to justify or prove that their decision to flare or vent was authorised under the legislation.

iv. Obligation to measure and record coal seam gas and petroleum mined

Under the MR Act, it is a condition of each coal or oil shale mining lease that its holder must use a meter to record the volume of coal seam gas mined in the area of the lease.³⁶ The provision specifies that the meter must measure the percentage of methane in each designated coal seam gas product measured,³⁷ and that the meter and corresponding measurement scheme must comply with the standards set out in the PGPS Act.³⁸ The MR Act does not provide that any results need be reported to the government.

The PGPS Act similarly requires that petroleum producers (including operators that release coal seam gas)³⁹ measure petroleum (including coal seam gas that is vented or flared)⁴⁰ with a meter that complies with requirements prescribed under a regulation⁴¹ at the frequency prescribed under a

³⁰ Whitehaven Coal, ‘Environmental Impact Statement: Greenhouse Gas Management and Abatement Plan’, November 2022, 20. Accessed at: <https://whitehavencoal.com.au/our-business/our-assets/winchester-south/>.

³¹ Ember, Risky Millions: Whitehaven’s methane potential, 17 August 2023. Accessed at: <https://ember-climate.org/insights/research/whitehavens-methane-potential/>.

³² MR Act s 318CM.

³³ MR Act s 318CN,

³⁴ MR Act ss 318CO(2)-(4).

³⁵ PGPS Act ss 151(2)-(3).

³⁶ MR Act s 318CU.

³⁷ MR Act, s 318CU(1)(c)(iv)(B).

³⁸ MR Act, s 318CU(1)(c)(i).

³⁹ See definition of “petroleum” in PGPS Act, s 10; PGPS Act s 10(1)(a) “a substance consisting of hydrocarbons that occur naturally in the earth’s crust” and PGPS Act s 15, “when petroleum is produced”.

⁴⁰ PGPS Act, s 801(2)(c).

⁴¹ See Petroleum and Gas (General Provisions) Regulation 2017, Part 6.

regulation.⁴² The provision does not apply to a product that is “unavoidably lost before it can be measured” or “lost or used as part of normal operations for instrumentation, purging, blowdown or similar activities.”⁴³

The measurement scheme with which the measurements must be compliant under both the MR Act⁴⁴ provision and PGPS Act, is operator-designed,⁴⁵ but must state an Australian or other standard with which their scheme is compliant.⁴⁶ If the operator becomes aware of a significant anomaly in the scheme or if there is a likelihood of inaccurate measurements under the scheme, they must “appropriately revise” the measurement scheme for the meter.⁴⁷ If the Chief Executive is satisfied that no measurement scheme applies to a meter, it may impose conditions,⁴⁸ or if they believe the measurement scheme is unsatisfactory, they can require it be amended.⁴⁹

Contravention with the measurement provision at s 801 of the PGPS Act attracts a penalty for non-compliance, the maximum being 500 penalty units⁵⁰ (by today’s value of \$154.80, approximately \$77, 400).⁵¹ Contravention of the corresponding MR Act provision in s 318CU might also be a general offence of contravening a provision of the MR Act, which attracts a penalty of 200 penalty units or imprisonment for 12 months.⁵²

Under the PGPS Act, there are also related, less serious, offences such as installing meters or conducting measurements that are non-compliant with a measurement scheme.⁵³

v. Obligation to report coal seam gas and petroleum mined

The controller of a meter discussed directly above (whether connected to a mining or petroleum lease) must, on or before 1 September each year, lodge a measurement report about its measurement scheme for the preceding financial year,⁵⁴ but the report is not required to detail actual quantities of gasses measured.⁵⁵

The holder of a petroleum lease must lodge a petroleum production report for the least for each 6-month period, that includes the volume of each petroleum product derived from petroleum, petroleum that was flared or vented in a gaseous state and petroleum that was used to produce petroleum.⁵⁶ The report is confidential until 6 months after the last day of the period to which the report relates.⁵⁷

The holder of a mining lease, must give the Minister, within 2 months after each anniversary day for the lease, an activity report for the lease,⁵⁸ which must state the amount and location of coal seam gas mined, with the percentage of methane in each designated coal seam gas product mined, and

⁴² MR Act, s 318CU(c).

⁴³ PGPS Act, s 801(2A).

⁴⁴ MR Act, s 318CU(1)(b).

⁴⁵ PGPS Act, s 636.

⁴⁶ PGPS Act, s 637(c).

⁴⁷ PGPS Act, s 639.

⁴⁸ PGPS Act, s 643.

⁴⁹ PGPS Act, s 644.

⁵⁰ PGPS Act, s 801(1).

⁵¹ Penalties and Sentences Regulation 2015 (Qld), s 3.

⁵² MR Act, s 412.

⁵³ PGPS Act, ss 640, 641.

⁵⁴ PGPS Act, s 650.

⁵⁵ PGPS Act, s 651.

⁵⁶ Petroleum and Gas (General Provisions) Regulation 2017 s 42.

⁵⁷ Petroleum and Gas (General Provisions) Regulation 2017 Schedule 1; Department of Resources, Practice Direction 6, Petroleum and Gas Reporting, July 2023, Version 1.4, 1.4.

⁵⁸ MR Act, s 315; Mineral Resources Regulation 2013, 29A.

including specification of: the amount sold, the amount disposed of other than by sale, each method of disposal other than sale, and the amount disposed of under each other method. The report is confidential until the mining tenure ends.⁵⁹

vi. Safety regulation for underground coal mines

There are monitoring requirements for methane concentration in coal mines under the *Coal Mining Safety and Health Act 1999* (Qld) (**CMSH Act**), which are in place to ensure methane quantities in underground coal mines do not reach explosive concentrations.⁶⁰ The purpose of the CMSH Act is to protect the safety and health of people at coal mines and those affected by coal mining operations,⁶¹ however that does not appear to extend to those affected by the impacts of the accumulation of greenhouse gas emissions contributing to climate change.

In practice, coal mine safety obligations under the CMSH Act are managed via processes such as pre-drainage of underground coal mines and VAM. The legislative focus on localised safety risks as opposed to climate change related risks is demonstrated in the limited regulation of how the gases are released to protect workers are processed or mitigated to manage their impact on the atmosphere (see Viii Flaring and venting restrictions).

vii. Code of Leak Detection, Management and Reporting for Petroleum Operating Plants

The *Petroleum and Gas (Safety) Regulation 2018* (Qld) (**PGS Regulation**) requires operators of petroleum plants to carry out their activities in accordance with a “leak management code”,⁶² currently, the “Code of Practice: For leak detection, management & reporting for petroleum operating plant” (**Leak Detection Code**).

The Leak Detection Code does not have a tailored standard for identification and management of leaks on petroleum operating plants, rather, adopts a standard designed for natural gas distribution networks in Central Business Districts and Metropolitan areas of Australian and New Zealand cities.⁶³ The classification of different leaks and their urgency for repair is based on risk profile⁶⁴ insofar as risk relates to health and safety.⁶⁵ It is not modelled to address the risks related to contribution to greenhouse gas emissions.

That context informs the limitations of the Leak Detection Code from the perspective of climate change harms. For instance, the only leakages with requirements for urgent repair are leaks that meet a set of criteria related to safety risk, such as leaks that are in enclosed spaces or could be a danger to workers of the general public.⁶⁶ Other leaks have no mandated timeframes in which they must be repaired. The Leak Detection Code also does not specify detection thresholds, has no technology standards, and only requires routine leak inspections every 5 years.⁶⁷

That sets Queensland well behind jurisdictions including the United States, the European Union (**EU**) and Canada.

⁵⁹ Mineral Resources Regulation 2013, Schedule 3A.

⁶⁰ CMSH Act, s 273; *Coal Mining Safety and Health Regulation 2017* (Qld) r 366.

⁶¹ CMSH Act, s 6(a).

⁶² PGS Regulation, s 27(3).

⁶³ Leak Detection Code, 6. See also AS/NZS: 4645.1:2018, Gas distribution network: Network management.

⁶⁴ Leak Detection Code, 12.

⁶⁵ Leak Detection Code, 6.

⁶⁶ Leak Detection Code, 12.

⁶⁷ Leak Detection Code, 11.

For example, regarding **timeframes for repair**, the United States (via the Environmental Protection Agency) and the EU each require detected leaks to be repaired within 30 days.⁶⁸ Canada ties repair timeframes to the scale of the leak, requiring 24-hour repairs for the largest leaks and up to 90 days for the most minor.⁶⁹

Regarding **inspection frequency**, the United States and Canada each require quarterly inspections of leak-prone equipment using best practice methods - Optical Gas Imaging and Method 21 (which uses Volatile Organic Compound monitoring instruments). The EU requires surveys every three months.⁷⁰

Regarding **equipment**, the EU requires operators to use detection devices that allow detection of loss of methane from components of minimum 500 parts per million,⁷¹ and replace all existing devices that do not meet that threshold standard.

Regarding **accountability**, the EU requires that operators undertake an initial survey of all relevant components to their responsibility for leak detection and repair and must submit reports of all surveys.⁷²

viii. Rehabilitation laws

A. Coal mining

Rehabilitation of mine sites currently in Queensland is governed by the EP Act and the *Mineral and Energy Resources (Financial Provisioning) Act 2018* (**Financial Provisioning Act**). The former outlines the standard by which mines must rehabilitate and the latter provides financial assurance that there will be funds available to pay for the rehabilitation where operators default on their obligations.⁷³

Conditions relating to rehabilitation are usually made within an EA. Under the EP Act, applications for new EAs related to mining activities must also be accompanied by a Progressive Rehabilitation and Closure Plan (**PRC Plan**)⁷⁴ which requires proponents to prepare a schedule detailing each rehabilitation “milestone” to be achieved as soon as practicable after the land is not being used for mining or infrastructure.⁷⁵ The purpose of the plan is to maximise the progressive rehabilitation of the land to a stable condition and clarify the condition to which the holder must rehabilitate the land before an EA may be surrendered.⁷⁶

DESI decides whether to approve a PRC Plan if they are satisfied it provides for all land the subject of the plan to be rehabilitated to a “stable condition” or managed in a way that minimises risk

⁶⁸ Environmental Protection Agency, Standards of Performance for New, Reconstructed and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review, 40 CFR, Part 60, Vol. 89, No. 47. Accessed at: https://www.epa.gov/system/files/documents/2023-12/eo12866_oil-and-gas-nsps-eg-climate-review-2060-av16-final-rule-20231130.pdf.

⁶⁹ Canada Gazette, Regulations Amending the Regulations Respecting Reduction in the Release of Methane and Certain Volatile Organic Compounds (Upstream Oil and Gas Sector) (16 December 2023), Part I, Vol. 157, No. 50. Accessed at: <https://www.gazette.gc.ca/rp-pr/p1/2023/2023-12-16/html/reg3-eng.html>.

⁷⁰ European Commission, Regulation of the European Parliament and of the Council: On methane emissions reduction in the energy sector and amendment Regulation (EU) 2019/942, 2021/0423, Art 14(2). Accessed at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52023AP0127> (**EU Methane Regulations**).

⁷¹ EU Methane Regulations, Art 14(3).

⁷² EU Methane Regulations, Art 14(7).

⁷³ Financial Provisioning Act, s 3.

⁷⁴ EP Act, s 125(1)(n).

⁷⁵ EP Act, s 127(5)

⁷⁶ EP Act, s 126B.

where an area cannot be rehabilitated to a stable condition.⁷⁷ The operator must also commission an audit of their PRC Plan every three years to report on compliance⁷⁸ and before an EA is surrendered, prepare a final rehabilitation report⁷⁹ that includes enough information for DESI to decide whether the EA conditions have been complied with and the land has been satisfactorily rehabilitated.⁸⁰

“Stable condition” of land is defined to include “no environmental harm being caused by anything on or in the land”,⁸¹ which would extend to methane emissions.⁸² However, there are no specific requirements to consider whether the PRC plan will effectively manage fugitive emissions from the abandoned mine site. In practice, neither EA conditions⁸³ nor PRC Plans provide for fugitive emission management as a rehabilitation requirement during or after mine closure.⁸⁴

At the time of EA surrender, operators must also provide a residual risk assessment.⁸⁵ Residual risks are risks that remedial action will need to be carried out in relation to the land in the foreseeable future despite the land being rehabilitated, and/or that ongoing management activities will need to be carried out in relation to the land, such as monitoring.⁸⁶ The Residual Risk Assessment Guideline includes a non-exhaustive list of risks that should be considered. It does not include risk of fugitive emissions. This, again, points to a regulatory framework that does not have fugitive methane emissions in mind.

The results of any application of rehabilitation laws at mine sites in Queensland has historically been opaque. In 2017, the Australia Institute sought information from then Department of Natural Resources and Mines and Department of Environment and Heritage Protection as to the application of rehabilitation laws to decommissioning mine sites. They found that at the time “no mine sites have been successfully rehabilitated and relinquished to the state or sold to third parties. Just two have had any areas of rehabilitation officially completed.”⁸⁷ This leaves little confidence that fugitive emissions risks at a growing list of closing mine sites will be adequately managed.

B. Abandoned coal mines

Abandoned coal mines are sites that no longer have a mining tenure or an EA.⁸⁸

EDO was advised by the Queensland Rehabilitation Commissioner in June 2024 that there are currently no abandoned coal mines in Queensland, but several in care and maintenance. Abandoned coal mines contributing to methane emissions will likely become a reality as coal demand reduces with decarbonisation policies increasing globally and existing coal mines come offline in the coming years, especially where current rehabilitation requirements do not include residual GHG emissions management.

⁷⁷ EP Act, s 176A(2)(c). See also definition “non-use management area”, s 112.

⁷⁸ EP Act, s 285(1).

⁷⁹ EP Act, s 262(1)(d).

⁸⁰ EP Act, s 264.

⁸¹ EP Act, s 111A.

⁸² EP Act, s 14.

⁸³ See Annexure A.

⁸⁴ See, for example, PRCP-EPML00350213; PRCP-P-EA-100265081; PRCP-EA0002912; PRCP-EPML00334613; PRCP-EPML00916813; PRCP-EPML00900113.

⁸⁵ EP Act, s 264A(1)(e).

⁸⁶ DESI, Residual Risk Assessment Guideline, 4.

⁸⁷ The Australia Institute, *Dark side of the Boom*, April 2017, 17. Accessed: [Dark side of the boom - The Australia Institute](#).

⁸⁸ MR Act, s 344.

Responsibility for assessing abandoned mine sites lies with the Queensland Government's Abandoned Mine Lands Program (**AML**P). Its Risk and Prioritisation Framework for Abandoned Mine Management and Remediation sets out a prioritisation process for remediation of abandoned mines.⁸⁹ Deciding whether and what action is taken is based on an assessment of risks to public health and safety, the environment, and property.⁹⁰ GHG emissions are not referenced as an example of a relevant environmental impact and the guidelines appear to reflect an emphasis on local air quality, surface water and groundwater issues.⁹¹ Currently the AMLP has three abandoned mine remediation projects in Central Queensland.⁹²

Were a coal mine to be abandoned today, there would likely be no oversight of their contribution to fugitive methane emissions.

C. Oil and gas

Rehabilitation requirements for oil and gas production sites are primarily regulated by EA conditions, which generally include a requirement to make a Rehabilitation Plan and report prior to relinquishing an EA.⁹³ Some conditions continue to have effect after an EA has ended.⁹⁴ Rehabilitation Plans under an EA, unlike a coal mine PRC Plan, are post-approval plans, i.e. the content of the plans does not require approval before the applicant is granted an EA.

Laws of general application apply to abandonment of petroleum wells and bores. Drilling and conversion of wells and bores,⁹⁵ and plugging or abandonment of wells and bores,⁹⁶ must be carried out in the way required by the "Code of Practice for the construction and abandonment of petroleum wells and associated bores in Queensland" (**Construction and Abandonment Code**) according to the PGS Regulation.

The Construction and Abandonment Code applies to any hole in the ground made by drilling, boring or other means, to explore for or produce petroleum, to inject petroleum or a storage gas into a natural underground reservoir, or through which petroleum or a prescribed storage gas may be produced. It includes coal seam gas produced associated with coal or oil shale mining.⁹⁷

It provides that "any well, bore or drill hole that is to be abandoned must be sealed and filled in such a manner to prevent leakage of gas and/or water"⁹⁸ where cement must be used as the primary sealing material.⁹⁹

⁸⁹ Authorisation to carry out remediation activities or rehabilitation activities on abandoned mine sites is given by s 344C of the MR Act.

⁹⁰ Department of Resources, Risk and Prioritisation Framework for Abandoned Mine Management and Remediation, March 2021, 19, Appendix 2.

⁹¹ Department of Resources, Risk and Prioritisation Framework for Abandoned Mine Management and Remediation, March 2021, 19, Appendix 2.

⁹² Queensland Government, Abandoned mine remediation projects. Accessed at:

<https://www.qld.gov.au/environment/land/management/abandoned-mines/remediation-projects>.

⁹³ See, for example, EPPG00611313, Schedule H; EPPG00928713, Schedule J; EPPG00881613, Schedule G; EPPG00968013, Schedule R.

⁹⁴ See, for example, EPPG00611313, Condition H8.

⁹⁵ PGS Regulation, s 35(2)(a).

⁹⁶ PGS Regulation, s 36.

⁹⁷ Construction and Abandonment Code, 1.

⁹⁸ Construction and Abandonment Code, 3.16.2(b).

⁹⁹ Construction and Abandonment Code, 3.16.2(d).

An operator can propose an alternate means of compliance to that within the Code by giving notice to the Chief Inspector if it achieves “a level of risk that is equal to or less than the level of risk that would be achieved by complying with this Code.”¹⁰⁰

Non-compliance with the Code without approval of an alternative means of compliance is an offence with maximum penalty of 500 penalty units.¹⁰¹

ix. Emissions targets in the *Clean Economy Jobs Act 2024 (Qld)*

Section 5 of the *Clean Economy Jobs Act 2024 (Qld)* (**CEJ Act**) sets emissions reductions targets for 2050 and provides for the creation of interim targets for 2040 and 2045 to be decided later. It also requires emissions reductions plans for sectors in Queensland to be created,¹⁰² and has established an expert panel to advise the Minister about achieving the targets.¹⁰³

While the enshrinement of emissions reductions targets is a positive step, there is no indication from the Act or the explanatory material that these targets will tangibly influence the assessment and enforcement frameworks for coal and gas production sites, which are two of Queensland’s most significant contributors to greenhouse gas emissions and methane emissions, in particular.

x. GHG Emissions Guidelines

EDO welcomes the initiative of DESI in its publication of GHG Emissions Guidelines for EA applicants. The requirement for GHG emissions abatement plans to be included in the assessment material, rather than created post-approval, is a positive step.

The guidelines, however, do not have legislative force, the proposed GHG abatement plans are proponent-led, they continue to permit problematic practices around offsetting, have no required standards for GHG estimations (including no connection to NGER Act requirements), and are silent on existing projects – the emissions from which should greatly outnumber those of new developments if DESI ceases approvals of new coal and gas projects (See [II Overriding recommendation](#)). It is also disappointing that the requirement in the draft document for projects originally captured by the Safeguard Mechanism to continue the same decarbonisation trajectory once no longer meeting the emission threshold, has been removed in the final version.¹⁰⁴

In March 2024, EDO made a joint submission highlighting these defects, relevantly including recommending that the guidelines be given statutory force via creation of standard conditions and that actual reductions be required for methane emissions in addition to any offsetting undertaken pursuant to the federal NGER Act scheme.¹⁰⁵ Those recommendations were not accepted during consultation.

The recommendations made in this report include continuation of the recommendations made to the Draft GHG Emissions Guidelines consultation.

¹⁰⁰ Construction and Abandonment Code, 1.2.

¹⁰¹ PGPS Act, s 283; s 292(4)(a).

¹⁰² CEJ Act, Part 3.

¹⁰³ CEJ Act, Part 4.

¹⁰⁴ DESI, Draft GHG Emissions Guideline, 9-10.

¹⁰⁵ Joint Submission of EDO, Australian Conservation Foundation, Lock the Gate Alliance and Queensland Conservation Council to Director-General of the Department of Environment and Science in response to consultation on the Draft Greenhouse Gas Emissions Guidelines, March 2024.

VI. Federal regulation of methane

Federal regulation of methane occurs mainly via the NGER Act and regulations,¹⁰⁶ designed to monitor GHG emissions via reporting requirements and reduce GHG emissions via gradual decrease of the emissions limit for approximately 215 of Australia's highest emitting facilities.

Both the emissions reporting and emissions reduction schemes have made eligibility conditional on annual emissions quantity. For emissions reporting, only facilities emitting over 25, 000t CO₂-e p.a. must report,¹⁰⁷ and the emissions reductions framework of the Safeguard Mechanism applies only to facilities emitting over 100, 000t CO₂-e per annum.¹⁰⁸ Every existing large facility is required to achieve a facility specific declining emissions baseline, pegged to the industry average and every new facility will be required to meet a baseline pegged to a best-practice baseline.

Most coal mines emit above these thresholds but many gas projects may not be regulated at all by the federal schemes.

For the projects that will fall within the schemes, their design provides little incentive for onsite, real emissions reduction, as a result of the unrestricted access to the purchase of credits to meet emissions reduction obligations. For facilities that meet 30% or more of this decline through the purchase of credits, explanation is required, but there is no practical limit on doing so.

This focus offends what DESI has indicated is the better approach to emissions reduction which is based on a GHG abatement hierarchy. As stated in DESI's GHG Emissions Guideline emissions management practices of a project must demonstrate that they are following a hierarchy which prioritises avoidance of GHG emissions over reductions, substitutions and finally, offsets.¹⁰⁹

Federal legislation is clearly not equipped to achieve DESI's policy of GHG abatement hierarchy, requiring Queensland to implement its own reforms.

i. National Greenhouse and Energy Reporting

The NGER Act governs national MRV standards applicable to facilities and corporations over certain thresholds via the *National Greenhouse and Energy Reporting (Measurement Determination) 2008 (Measurement Determination)*.¹¹⁰ The Measurement Determination provides four options for reporting methods, known as Methods 1-4. In short:¹¹¹

- Method 1 is based on default emissions factors, which work by converting a unit of activity into an emissions equivalent.
- Methods 2 and 3 require some facility-specific information such as industry-based sampling according to Australian or international standards, and Method 3 also requires that the standards be applied to analysis.

¹⁰⁶ Note: this report does not address offshore petroleum regulation in the *Offshore Petroleum and Greenhouse Gas Storage Act 2006 (Cth)*.

¹⁰⁷ NGER Act, s 13.

¹⁰⁸ *National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015 (Safeguard Mechanism)*, s 8.

¹⁰⁹ DESI, Draft GHG Emissions Guideline, 10.

¹¹⁰ For example, a coal or gas mine will only need to report if it emits 25,000 tonnes or more of carbon dioxide equivalent (CO₂-e), produces 100 TJ or more of energy, or consumes 100 TJ or more of energy. See Clean Energy Regulator, NGER Reporting Thresholds. Accessed: <https://www.cleanenergyregulator.gov.au/NGER/Reporting-cycle/Assess-your-obligations/Reporting-thresholds>.

¹¹¹ Climate Change Authority, Review of the National Greenhouse and Energy Reporting Legislation (**CCA Review**) (December 2023), 19.

- Method 4 is the only method that requires direct monitoring of actual emissions on a periodic or continual basis.

Reporters have the choice of which method to apply, with some restrictions depending on sector. Examining the methods available for reporting fugitive emissions suggests the limitations of the Measurement Determination to monitor methane emissions.

For example, as far as fugitive emissions from coal and gas are concerned, Method 1 is a legitimate reporting method for all fugitive emissions sources other than pre-mine drainage, and extraction of coal in underground coal mines.¹¹² It requires no site-specific monitoring.

Relevantly, the Climate Change Authority's 2023 review of the NGER Act found that where facilities reported using Methods 1-3, there were significant discrepancies between reported emissions and emissions estimated using satellite data.¹¹³ Certain fugitive emissions don't have to be reported at all, such as those from decommissioned open cut coal mines.¹¹⁴ As a result, it is likely that actual methane emissions in Queensland are at least 60% higher than currently reported.¹¹⁵

Importantly, MRV methods in the NGER Act are likely to undergo significant reform following the recommendations of the Climate Change Authority in its review. In broad terms, the Climate Change Authority recommended upgrading MRV methods for fugitive methane emissions to "higher order methods",¹¹⁶ including a recommendation to incorporate "cross-checking" measures to reconcile onsite measurement with satellite data or remote sensing technologies. Such reforms would bring Australian reporting standards in line with current international best practice, currently considered by the Climate Change Authority to be the Oil and Gas Methane Partnership 2.0 (OGMP 2.0) and Metcoal Methane Partnership (MMP).¹¹⁷ They will also likely demonstrate that fugitive methane emissions from coal and gas projects are more extensive than currently comprehended by climate change policy in Queensland, and at the federal level, where the effectiveness of Safeguard Mechanism relies in part on accurate reporting.

In April 2024, Exposure Draft regulation was exhibited to implement some recommendations of the NGERs review, including phasing out the use of Method 1 by coal mining facilities covered by the Safeguard Mechanism.

ii. Safeguard Mechanism

The *National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015* (**Safeguard Mechanism**) is empowered by s 22XS of the NGER Act and has as its purpose that the net greenhouse gas emissions of each "designated" facility does not exceed its set baseline of emissions. The facilities captured by this scheme emit over 100,000t CO₂-e per annum. Their baselines must reduce 4.9% per annum unless they are a Trade Exposed Baseline Adjusted facility, which are facilities facing "elevated risk of carbon leakage."¹¹⁸ In that case, they can apply for a discounted baseline decline rate at no less than 2%.¹¹⁹ A facility can meet their baseline targets by actual onsite emissions

¹¹² CCA Review, Appendix D: Method Availability for Reporting Fugitive Methane Under the NGER Scheme.

¹¹³ CCA Review, 5.

¹¹⁴ CCA Review, 6.

¹¹⁵ IEA Methane Tracker.

¹¹⁶ CCA Review, 6.

¹¹⁷ CCA Review, 6.

¹¹⁸ See DCCEEW, Safeguard Mechanism Reforms Factsheet, 6.

¹¹⁹ DCCEEW, The Safeguard Mechanism Reforms Position Paper, 48.

reduction, or purchase and surrender of ACCUs¹²⁰ or Safeguard Mechanism Credits (in-scheme credits) (**SMCs**).¹²¹

There are several reasons why the Safeguard Mechanism does not address Queensland's methane problem.

- (1) Coal and gas projects were likely contemplated by the drafters of the Safeguard Mechanism reforms to be eligible for the status of "Trade Exposed Baseline Adjusted Facility". This is suggested by the government's explanation of the types of eligible facilities as those facing an elevated risk of carbon leakage. If coal or gas projects successfully apply for this status, they will receive baseline rate deductions lower than the default 4.9%.
- (2) All existing facilities are currently transitioning to using government approved industry average emissions intensity values (**industry average values**) to set their baselines. The effect of calculating baselines against the average of the very high emitters and lower emitters in the coal mining sector is that the latter will automatically receive SMCs from the scheme in recognition of "emissions reductions" that have not actually occurred, and the former will be able to achieve their "emissions reductions" by the purchase of those SMCs.

To illustrate the problem in the current context, the coal mining sector's industry average values are found across both open cut and underground coal mines, where most open cut coal mines report significantly fewer methane emissions per tonne of coal than underground mines. In the short term, open cut coal mines will immediately fall below the industry average and have access to a glut of SMCs, which can flow to offset the underground coal mines with above-industry average emissions. Once the transfer is complete, no real emissions reduction has occurred. The problem is exacerbated because there are limited abatement options for open cut coal mines once mining has commenced. So widespread are emissions intensities in the coal mining sector, that this averaging may continue to cancel out even the effect of the annual decline rate out to 2030, effectively relieving the coal sector from the requirement to undertake direct abatement.¹²²

- (3) The Safeguard Mechanism does not differentiate greenhouse gases, how they are generated, or the abatement options available. Some of the special characteristics of methane include that the release of fugitive emissions triggered by coal mining is sometimes a passive process that continues even after mining has ceased and in the case of existing open cut mines, is not always within the control of the operator. Moreover, abatement of methane in the near term is necessary to achieve the 1.5°C stabilisation goal because of its disproportionate warming impact in the short term.
- (4) Methane abatement relies on restricting the activity of coal mining itself, which is a power largely controlled by the state government. The Safeguard Mechanism provides no approval mechanism to prevent new entrants into the scheme or prevent the expansion of existing facilities. The Queensland government therefore has a crucial role in achieving Australia's Nationally Determined Contribution under the Paris Climate Agreement.

¹²⁰ Safeguard Mechanism, Part 4, Division 5.

¹²¹ Safeguard Mechanism, Part 3A.

¹²² Energy and Resource Insights, Money for nothing: Australia coal mines under the reformed safeguard mechanism, 1, October 2023.

Accessed:https://assets.nationbuilder.com/lockthegate/pages/8405/attachments/original/1696370769/Cross-cutting_-_Report__Coal_in_Safeguard_2.0_Oct23.pdf?1696370769.

- (5) There is no limit on the number of ACCUs that a facility can use to meet their targets and the cost of an ACCU will likely be lower than the cost of onsite abatement. ACCUs cannot, in real terms, offset one tonne of methane emissions reduction. The reason is explained at [ii](#) “Offsets are not the solution where fast abatement is needed.”

All factors considered, the Safeguard Mechanism in practice contains little incentive for onsite abatement which would see real emissions reduction.

VII. Recommendations

The following recommendations have been drafted to address the limitations and gaps in the current regulation of methane emissions at both a state and federal level. They draw on influences such as the Regulation of the European Parliament and of the Council on Methane Emissions Reduction in the Energy Sector (**EU Methane Regulations**),¹²³ the United States Environmental Protection Authority's Emissions Guidelines,¹²⁴ policy analysis by the International Energy Agency¹²⁵ and Rennie Advisory,¹²⁶ and ongoing work of Australian experts including from Ember and Environmental Defense Fund.

Their design is based on an emissions reduction hierarchy, beginning with the submission that the most effective emissions reductions in the energy sector will come from approving no new coal or gas projects. The next priorities are to transition the highest emitting sources to their lowest emitting alternatives: for example, upgrading venting to flaring, and flaring to capture and destruction, wherever feasible.

The Queensland government has available several routes to achieve the effect of these recommendations: through direct legislative change, amendments to administrative documents, creation of new policy under Chapter 2 of the EP Act, or mass-updates to current and future EAs using existing powers of the administering authority under the EP Act. The pathway that EDO sees as the most direct route to rapid emissions reduction in the energy sectors is the one set out below.

EDO reiterates that the Queensland government can commit enormous methane emissions reductions this year, without passing new legislation, through immediate implementation of **Recommendations (i) and (ii)**.

i. Draft new standard conditions requiring fossil fuel projects to mitigate methane emissions.

One of the simplest ways to achieve transformative reform of methane regulation in Queensland, requiring no legislative amendment, is by using existing powers in the EP Act to amend existing and future EAs en masse.

The EP Act grants power to the Chief Executive to make new standards for environmentally relevant activities (**ERA**) and corresponding conditions at any time, without qualification, provided they give public notice and invite submissions.¹²⁷

¹²³ European Commission, Proposal for a Regulation of the European Parliament and of the Council on methane emissions reduction in the energy sector and amendment Regulation 2019/942, 15 December 2021, 2021/0423. Accessed at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2021%3A805%3AFIN> (**EU Regulations**).

¹²⁴ Environmental Protection Agency, Standards of Performance for New, Reconstructed and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review, 30 November 2023, Unofficial Notice. Accessed: [ENVIRONMENTAL PROTECTION AGENCY 40 CFR Part 60 \[EPA-HQ-OAR-2021-0317; FRL-8510-01-OAR\] RIN 2060-AV16: Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review.](#)

¹²⁵ IEA, Policy Database. Accessed: <https://www.iea.org/policies>.

¹²⁶ Rennie Advisory, Methane Emissions Reduction: International policy and technology insights for the Australian fossil fuel sector, August 2023. Accessed at <https://www.rennieadvisory.com.au/insights-portal/3enn51koxztkzi89gvrzn1ilu7ygkf> (**Rennie Report**).

¹²⁷ EP Act, s 318.

A corresponding provision allows for DESI to amend existing EAs to reflect the new standard conditions,¹²⁸ where the Chief Executive has stated that they apply to existing EAs.

The new standard conditions could prescribe methane mitigation actions and performance standards or reference an external document containing requirements in place from time to time and subject to periodic expert review. Where an applicant cannot meet the standard conditions, they must make a Variation Application which puts the onus on the proponent to prove why they should be permitted to not meet those requirements.¹²⁹

The EP Act provides a second pathway where DESI may amend existing EAs in circumstances where they were issued on the basis of a miscalculation of the environmental values affected or likely to be affected by the relevant activity, or the quantity or quality of contaminant permitted to be released into the environment, or the effects of the release of a quantity or quality of contaminant permitted to be released into the environment.¹³⁰ These preconditions are met in these circumstances given that methane emissions have historically been underreported and new evidence is emerging by satellite data as to the extent of the environmental harm existing coal and gas projects are causing.

Some examples of best practice for methane mitigation to date are included below for implementation via new conditions and applicable to existing EAs, where relevant.

Any new conditions must be accompanied by better resourcing of EA enforcement teams, which have capacity to schedule audits and receive monitoring data to ensure compliance with conditions. (See **Recommendation (iv)**).

A. Assessed GHG emissions abatement plan must be in force.

The GHG Emissions Guidelines suggest that DESI may begin to impose conditions that require EA holders to implement a GHG abatement plan that has been part of the assessment process.¹³¹ Turning this ambition into a standard condition would provide clarity and transparency for community and encourage foresight from industry.

A GHG assessment with detailed modelling must be undertaken as part of the assessment process to properly assess the merits of the proposed GHG abatement plan before approving a project. The inclusion of such considerations in the assessment criteria is recommended at **Recommendation (iii)**.

These changes should apply to existing environmental authorities, and any new and varied environmental authorities, requiring GHG abatement plans to be drafted and assessed during operations for existing projects.

B. Set emissions limit of projects.

The GHG Emissions Guidelines suggest that DESI may begin to impose conditions that require EA holders to meet specific targets or *actual* GHG emissions limits (i.e. not including offsets).¹³² Making emissions limits part of the standard conditions ensures that if projects are approved, they are not approved having a likelihood of above-average emissions intensity. It also encourages existing projects to assess their capability for onsite emissions reduction in the short-term, through methods such as equipment upgrade, leak detection and repair improvements or progressive pre-mine drainage of new mine pits on an approved mining lease. The limit can be

¹²⁸ EP Act, s 213.

¹²⁹ EP Act, s 123.

¹³⁰ EP Act, s 215.

¹³¹ DESI, Draft GHG Emissions Guidelines, 14.

¹³² DESI, Draft GHG Emissions Guidelines, 14.

drafted with site-specific characteristics in mind, taking into account the size and schedule of the operation and the source and controllability of methane emissions. For open cut mines, for example, emissions limits must be strictly imposed at commencement, given lack of options for abatement once mining begins. For underground mines, particularly those already operating, a declining annual emission limit or proscribed action requirement may be more appropriate.

Again, a GHG assessment with detailed modelling must be undertaken as part of the assessment process to scrutinise whether a proponent's assertion that they can meet the emissions limit can be proven before their project is approved.

C. Define a fugitive emissions “event” and require explanation and plan for restitution.

According to a report released by the Australian Conservation Foundation in April 2024, Hail Creek Open Cut Coal mine allegedly released 8640 t of methane over 16 days in June 2023, which is more than what it reports to emit over a 12-month period.¹³³

An emissions limit for a project, while useful, would not necessarily account for these extreme emissions events taking place over a short period of time.

DESI should define the number of emissions released that would constitute an “event” that should require a report from the operator explaining the cause of the event, the work done in response to the event, and the plan to ensure emissions releases like those of the event do not reoccur. That information should be publicly available on the public register.

D. Publish periodic best-practice monitoring data, including monitoring results undertaken in response to a complaint or “event”.

The GHG Emissions Guidelines suggest that DESI may begin to impose conditions that require EA holders to report on progress against their GHG abatement plan and/or undertake monitoring of GHG emissions.¹³⁴

This intention can be enacted through the creation of a standard condition that mandates periodic publication of emissions monitoring data and ad hoc publication of monitoring undertaken in response to a complaint. That information should be accessible on the public register.

The monitoring methodology required must be the most accurate of the following: the NGER MRV standards after implementation of the pending NGER Act reforms, *or* the OGMP 2.0 (oil and gas) or MMP (coal), *or* current international best practice as defined by an independent body.

E. Require best-practice technology implementation and utilise operational restrictions where technology is not available

Best practice technology will be a dynamic question in the pursuit of emissions reductions indefinitely. Standard conditions should refer to application of best available equipment and technology, including venting and flaring equipment. An independent body should be responsible for reviewing international best practice standards periodically.

Examples to date could include requiring equipment that vents to be replaced by non-emitting alternatives where they meet the standards and technical prescriptions for components designed

¹³³ ACF, Annual Australian methane plume summary: 2023, 16 April 2024. Accessed at: <https://www.acf.org.au/annual-australian-methane-plume-summary-2023>.

¹³⁴ DESI, GHG Emissions Guidelines, 11.

to vent,¹³⁵ or only allowing flaring combustion devices with an auto-igniter or continuous pilot, and complete destruction removal efficiency for hydrocarbons.¹³⁶

Other jurisdictions within the UK, Canada, and the US,¹³⁷ have been successful in setting emissions thresholds on standard equipment such as compressors, pneumatic devices and storage vessels. Colorado regulation, for example, requires that large storage tanks meet a 95% Volatile Organic Compound reduction targets, and flares must be designed for 98% efficiency.¹³⁸

Where best practice changes during a project's lifetime in accordance with a periodic review, the conditions should allow a reasonable time in which operators must become compliant with updated standards.

Operational restrictions must be applied and approval should not be granted for new and varied Environmental Authority applications where a proponent indicates abatement opportunities are unavailable, which is frequently the case for open cut mines and sometimes for underground mines, depending on geological factors.

F. Require robust leak detection and repair standards (via revision of the Leak Detection Code)

The current version of the Leak Detection Code, as set out above in this report, is leagues behind peer jurisdictions in terms of its application to mitigation of fugitive methane emissions. Perusal of relevant existing EA conditions at Annexure A demonstrate that where leak detection and repair programs are required, they are not linked to a particular standard, including the current Leak Detection Code.¹³⁹

Standards for leak detection and repair, like those implemented by the US, Canada, and the EU discussed above, should be implemented in Queensland: mandating repair timeframes, inspection frequencies, detection equipment and accountability measures.

This can be achieved by updating Queensland's Leak Detection Code and requiring compliance with it as a standard condition, and publicly accessible reports on leak incidents. The Leak Detection Code should be subject to periodic review against best practice standards by an independent body.

ii. Create a framework for decision making aligned with Queensland's climate change targets via creation of an Environmental Protection Policy (Greenhouse Gas Emissions).

To provide for the building blocks for implementing the *Clean Economy Jobs Act 2024* (Qld) emissions reductions target, an Environmental Protection Policy (Greenhouse Gas Emissions) should be implemented under Chapter 2 of the EP Act. This policy should provide the specific assessment measures for emissions reductions to be achieved, treating methane emissions separately to recognise their different character and potential to carbon dioxide. Such a policy should be referenced throughout the administrative decision-making frameworks in the MR Act, EP Act and PGPS Act as a necessary consideration when making decisions that have the potential to contribute to greenhouse gas emissions.

¹³⁵ See, for example, EU Regulations, Art. 15(4)(a).

¹³⁶ EU Regulations, Art. 17.

¹³⁷ Rennie Report, 69.

¹³⁸ Rennie Report, 72.

¹³⁹ See, for example, EPML00658213, Condition H36.

iii. Update assessment criteria for coal mines to include risk assessment of fugitive emissions intensity and capacity to abate.

No new coal mines or extensions should be approved, on the basis that refusal of new fossil fuel projects is the surest pathway to a safer climate that sees less than 1.5°C of global warming.¹⁴⁰ At a bare minimum, it would be unfathomable, and an unjustifiable limitation on human rights,¹⁴¹ to approve new coal mines or extensions in Queensland where they are at risk of exposing methane-rich coal seams, and where they have been unable to demonstrate a genuine capacity to abate in their application material.

The Recommendations A and B below can be incorporated in the decision-making process via inclusion in EIS materials, update to the definition of the standard criteria in the EP Act, or direct amendment of the decision criteria in ss 173, or 176, 191 and 194B of the EP Act and/or ss 267 and 269(4) of the MR Act.

For coherence, the decision criteria should also reflect Queensland’s emissions reduction targets in the *Clean Economy Jobs Act 2024*, by requiring its consideration by the decision-maker, as well as the Environmental Protection Policy (Greenhouse Gas Emissions) recommended above at **Recommendation (ii)**.

A. No projects can be approved in high-risk areas.

The amount of methane released during coal mining depends on several factors, including coal rank, coal seam depth, method of mining and location.¹⁴² Particular coal seams in Queensland have been demonstrated to emit extreme quantities of methane emissions compared to others. For example, most of *Australia’s* reported coal mine methane (58.9%) is released from Queensland’s Bowen Basin alone.¹⁴³ The Bowen Basin is home to what has been identified by researchers at the Netherlands Institute for Space Research and the 6 “super emitting” coal mines in Queensland: Hail Creek Open Cut, Broadmeadow Coal Mine, Grosvenor Coal Mine, Moranbah North, Grasstree Mine and Oaky North in the Oaky Creek Mining Complex.¹⁴⁴ Several coal mines in the Bowen Basin are currently applying for extensions of their existing operations which risk exposing more methane-rich seams: including the Hail Creek Eastern Margin Extension Project (A-EA-AMD-100576264) and Blackwater North Extension Project (A-EA-AMD-100557544).

Section 173 of the EP Act provides for situations where particular applications must be refused, currently, when an applicant is not a registered suitable operator. That provision could be amended to include situations where EA applications for mining activities related to a mining lease are proposed on a “high risk” area for fugitive emissions.

This amendment would require DESI to first conduct an inquiry to determine high-risk areas for fugitive emissions, that could use existing satellite data and associated research as guidance. The Bowen Basin region would certainly fall into this category. For “greenfield” sites, where the

¹⁴⁰ See Intergovernmental Panel on Climate Change AR6, Longer Report, 48. Accessed: https://report.ipcc.ch/ar6syr/pdf/IPCC_AR6_SYR_LongerReport.pdf; IEA Roadmap.

¹⁴¹ *Human Rights Act 2019 (Qld)*, Preamble, 5, ss 8, 13. See also *Waratah Coal Pty Ltd v Youth Verdict & Ors (No. 6)* [2022] QLC 21, [40]-[45].

¹ IPCC, Good Practice Management, 130.

¹⁴³ ERI, Fossil Methane Report, 11.

¹⁴⁴ Sadavarte et al, Methane Emissions from Superemitting Coal Mines in Australia Quantified Using TROPOMI Satellite Observations, 55 *Environmental Science and Technology* 24, 2021. Accessed: [Methane Emissions from Superemitting Coal Mines in Australia Quantified Using TROPOMI Satellite Observations | Environmental Science & Technology \(acs.org\)](https://doi.org/10.1021/acs.est.1c01111).

methane richness of particular coal seams is less well known, applicants for an EA must be required to commission a detailed survey of the area in preparation of an EIS to assess risk of fugitive emissions.

B. Projects cannot be approved if they cannot demonstrate a genuine capability to abate.

If DESI cannot be satisfied that a project has the capability to abate its methane emissions in its assessment material, it cannot be approved. This puts the onus on the proponent to investigate and demonstrate the commercial and technical feasibility of their proposal in the context of tighter environmental laws, pre-approval.

iv. Resource the Departmental civil enforcement team to enforce new and existing conditions.

As discussed under “Conditions regulating methane”, while there are few commonly imposed EA conditions that go specifically to methane emissions, there do exist conditions which could be applied to regulate them, such as those related to hazardous contaminants or creation of serious environmental harm. However, in practice, there is no evidence that DESI does employ these conditions to regulate methane emissions.

Existing conditions and those recommended above will only be effective if they are enforceable. DESI should be empowered with more resourcing to regularly schedule audits pursuant to s 322-326 of the EP Act, to ensure conditions are being honoured and to take action when they are not. Emerging open-source satellite data platforms will make it easier for DESI to monitor methane emissions events and follow up with operators.¹⁴⁵

v. Commission an independent working group for periodic review of best practice standards required for mitigating emissions.

To protect the integrity of the recommended conditions at **Recommendation (i), D, E and F**, which all reference “best-practice”, an independent body should be established in Queensland to meet periodically and make any necessary updates to a “best practice” standard against which operators must comply.

vi. Provide staged regulation leading to a ban of venting and flaring except in emergencies.

The UK, US and Canada have committed to zero routine flaring and venting by 2030.¹⁴⁶ The Queensland government should follow suit by banning non-emergency venting, and restricting non-emergency flaring, with the aim to transition to a complete ban across the fossil fuel sector by 2030 or sooner.

The legislative amendments recommended at **A-C** below should also make provision for enforcement opportunities and consequences of non-compliance including penalties.

¹⁴⁵ See, for example, Open Methane: <https://openmethane.org/>. Full website functionality due in 2024.

¹⁴⁶ Rennie Report, 69.

A. Ban non-emergency or avoidable venting at oil and gas production sites.

In recognition of the comparatively higher global warming potential of venting, sections 72 and 151 of the PGPS Act should be amended to implement a ban on venting except:¹⁴⁷

- (1) In case of an emergency or malfunction; or
- (2) Where unavoidable and strictly necessary for the operation, repair, maintenance or testing of components or equipment.

Where venting is permitted pursuant to (1) and (2), operators can vent only where flaring is not technically feasible due to a lack of flammability, or inability to sustain a flame despite changes in operational practice, risk of endangering personnel, or would lead to a worse environmental outcome in terms of emissions. In such a situation, operators shall notify and provide evidence to DESI of the necessity to opt for venting instead of flaring.

This recommendation adopts the wording of Article 15 of the EU Methane Regulations.

B. Restrict non-emergency flaring at oil and gas production sites.

Flaring under the PGPS Act should only be allowed where re-injection, onsite utilisation, or dispatch of methane to the market is not possible for reasons other than commercial feasibility.¹⁴⁸ This recommendation coupled with that at **Recommendation (vi)A** privileges flaring over venting because it is comparatively less emissions-intensive, but only where capture is impossible.

Where capture is not possible, the legislation must require that the operator provide written justification for their need to flare.

This Recommendation must also be implemented with **Recommendation (i)E**, which would require any flaring that must take place to use equipment that minimises methane leakages, such as devices with an auto-ignitor or continuous pilot.¹⁴⁹

C. Ban venting from drainage sites at coal mines.

Section s 318CO of the MR Act should be amended to:

- (1) ban venting from drainage sites at coal mines with the same exceptions as relates to oil and gas in **Recommendation (vi)A**; and
- (2) restrict flaring from drainage sites at coal mines to the same set of circumstances set out as relates to oil and gas in **Recommendation (vi)B**.

D. Resource a working group to facilitate safe, industry-wide implementation of VAM technologies for underground coal mines. Incentivise uptake.

Despite its low methane content, VAM from underground coal mines is the largest contributor to coal mine methane emissions because it is emitted constantly over the duration of the lifetime of the mine, accounting for approximately 75% of emissions.¹⁵⁰ The dominant means of reducing the greenhouse gas impact of VAM is by capturing methane and extracting it for capture, or destroying it.

Australian implementation of this technology is underway. CSIRO has developed three technologies that are aimed at fugitive emission mitigation from VAM by destroying, enriching and capturing it in

¹⁴⁷ EU Methane Regulations, Art. 15.

¹⁴⁸ EU Methane Regulations, Art 15(5).

¹⁴⁹ See, for example, EU Methane Regulations, Art 17(1).

¹⁵⁰ Ember, Australia's Coal Mine Methane Report, 32.

a manner safe for workers: VAMMIT destroys methane via a compact flow reversal reactor with a newly structured regenerative bed; VAMCAP separates methane from ventilated air using carbon composites, making it useable; and VAMCAT uses a gas turbine to create energy from the captured methane.¹⁵¹ In 2023, CSIRO received a grant to conduct site trials of the technology.¹⁵² New South Wales via the *Coal Innovation Administration Act 2008 (NSW)*, has also funded research and trials into VAM abatement.¹⁵³ According to Ember, the German Creek power station in Queensland has been powered by captured VAM since 2006.¹⁵⁴

Given VAM's enormous contributions to Queensland's methane footprint, its abatement must be an arterial part of emissions reduction ambitions. EDO anticipates that VAM abatement projects will be funded by the government's new Low Emissions Investment Partnerships program. The government should also resource a workgroup to design state-wide implementation of VAM technologies at existing coal mines and develop standard conditions relevant to VAM for any future coal mines. Incentives for uptakes must be considered as a part of this plan.

E. Resource a working group to facilitate industry-wide implementation of open cut mine drainage technology. Incentivise uptake.

There is very little industry-uptake of pre-drainage of open cut coal mines using boreholes, despite being a demonstrably effective emissions reduction tool.¹⁵⁵

Analysis by Ember has found that if pre-drainage were implemented at Australia's methane-intensive surface mines, coal mine methane emissions could be reduced by approximately 8%.¹⁵⁶

The Queensland government should resource a workgroup to develop state-wide implementation of open-cut pre-drainage at existing coal mines that are expected to open new pits, and standard conditions relevant to any future coal mines. Incentives for uptakes must be considered as a part of this plan.

vii. Ensure that management of mines in care and maintenance and rehabilitation regulation of closing coal mines, gas and oil wells minimises risk of abandoned-site methane.

Methane emissions at abandoned mine sites,¹⁵⁷ or sites in care and maintenance, (known internationally as "abandoned mine methane"), will become an enormous problem in Queensland, as coal mining decreases with increasing moves to decarbonise globally and projects reach the end of their project lifecycles.¹⁵⁸ Evidence given at the United Nations Economic Commission for Europe 9th International Forum on Energy for Sustainable Development estimated that abandoned mine methane would rise to represent approximately 24% of all coal mine

¹⁵¹ CSIRO, Mine ventilation air methane abatement. Accessed at: <https://www.csiro.au/en/work-with-us/industries/mining-resources/mining/fugitive-emissions-abatement/mine-ventilation-air-methane-abatement>.

¹⁵² Australian Government, Department of Industry, Science and Resources, Methane abatement technology projects receive \$4.35 million, 29 November 2023. Accessed: <https://www.industry.gov.au/news/methane-abatement-technology-projects-receive-435-million>.

¹⁵³ IEA, Policy Tracker, NSW Coal Innovation Fund, 2 February 2023. Accessed: <https://www.iea.org/policies/16686-nsw-coal-innovation-fund>.

¹⁵⁴ Ember, Australia's Coal Mine Methane Report, 32.

¹⁵⁵ Ember, Australian Methane Cuts Report, 10.

¹⁵⁶ Ember, Australian Methane Cuts Report 10.

¹⁵⁷ Ember, Australian Methane Cuts Report.

¹⁵⁸ The Australia Institute, Dark side of the boom: What we do and don't know about mines, closures and rehabilitations, 2017. Accessed: [Dark side of the boom - The Australia Institute](https://www.austlii.edu.au/au/other/dfat/special/australia_institute/dark_side_of_the_boom/).

methane in the world by 2100.¹⁵⁹ Currently, abandoned mine methane represents at least 3% of Australia's coal mine methane emissions.¹⁶⁰ This is likely to be a significant underestimate in the future if current reporting requirements remain unchanged, such as there being no requirement at a federal or state level in Queensland to report on emissions of decommissioned open cut coal mines.¹⁶¹ Queensland should revamp rehabilitation laws to monitor the damage and prevent the exponential growth of abandoned site methane as coal mines come offline.

A. Require ongoing methane monitoring at abandoned sites and sites in care and maintenance as a condition of PRC Plans and Residual Risk Assessments.

Section 176A(3) of the EP Act prevents the administering authority from approving PRC Plan schedules in certain circumstances, including when the administering authority is not satisfied the schedule provides for all land to be rehabilitated to a stable condition or managed as a non-use management area. This provision should be amended to require PRC Plan schedules to include plans for progressive and post-operational monitoring and reporting of methane emissions, as well as remediation works where methane seepages or leakages are detected. This provision should be applicable to non-use management areas¹⁶² as well as areas available for rehabilitation. Section 126D which sets out the requirements for a proposed PRC Plan schedule should also reflect this update for consistency and corresponding updates should be reflected in the Residual Risk Assessment Guideline.

To apply the same standard to existing projects that already have approved PRC Plans, the list of circumstances in s 215(2) in which DESI can amend a PRC Plan schedule at any time should be amended to include where the PRC Plan schedule does not already include provision for post-operational monitoring and reporting on methane emissions.

An additional consideration for source-site reconciliation of operator-led monitoring at abandoned sites is the emerging policy measure in jurisdictions such as California of government-conducted remote methane emissions monitoring. In 2022, the Californian legislature approved funding to expand the frequency and area covered by remote sensing and satellite technology to monitor emissions.¹⁶³ A similar program could be rolled out in Queensland.

B. Introduce PRC Plans as requirements for oil and gas EA applications.

EA applications associated with petroleum activities do not currently require rehabilitation plans to be assessed and approved prior to EA approval. This is out of step with requirements for EAs associated with mining activities, and PRC Plans should be introduced into the petroleum activities approval framework. The same recommendations at **Recommendation (vii)A** above should be embedded from the start in the necessary legislative changes to ensure that fugitive emissions are a central focus of the PRC Plans.

¹⁵⁹ Nazar Kholod et al, Global CMM and AMM Emissions: Implications of Mining Depth and Future Coal Production, Presentation at the 9th International Forum on Energy for Sustainable Development, 2018, Kyiv, Ukraine. Accessed: https://unece.org/fileadmin/DAM/energy/images/CMM/CMM_CE/9 - CMM - Kholod_Mining_depth_and_emissions.pdf.

¹⁶⁰ Ember, Australian Methane Cuts Report, 10.

¹⁶¹ CCA Review, 6.

¹⁶² EP Act, s 112.

¹⁶³ Rennie Report, 46.

C. Work with Mine Rehabilitation Commissioner and Petroleum and Gas Inspectorate to audit all coal mines in care and maintenance, and abandoned oil and gas wells, for methane seepages and leakages.

Queensland's contributions to abandoned site methane are relatively unknown, and workgroups such as the AMLP are critically under resourced to effectively assess and address risks of methane seepages and leakages. The Queensland government should conduct an audit of any coal mines in care and maintenance and abandoned oil and gas wells to check for fugitive methane emissions and plug the leaks.

Funding for this project could come from the Financial Provisioning Act scheme fund under s 63 of the Financial Provisioning Act and fall partially or fully within the ambit of the existing roles of the Office of the Mine Rehabilitation Commissioner and Petroleum and Gas Inspectorate.

viii. Introduce a fee per tonne of methane emissions released based on New South Wales' pollutant load-based licencing fees.

As discussed, the federal legislation does not incentivise onsite abatement of methane emissions. To generate serious uptake of the required abatement technology, the Queensland government must consider financial measures, consistent with the "polluter pays" principle of Ecologically Sustainable Development.¹⁶⁴

This is a tested method for methane reduction in other jurisdictions. In the United States, for example, the Senate in 2022 approved the *Inflation Reduction Act 2022*, which introduced a charge on methane emitted by oil and gas companies who report emissions under the *Clean Air Act (1970)*.¹⁶⁵

A useful model for Queensland is the existing load-based licencing scheme in New South Wales under the Protection of the Environment Operations (General) Regulation 2009 (NSW), which sets limits on pollutant loads emitted by the holders of environment protection licences and links licence fees to pollutant emissions.¹⁶⁶ Queensland could introduce a similar scheme for all pollutants in Queensland, including greenhouse gas emissions, and calculate fees based on the social cost of each distinct greenhouse gas, taking into account their varying global warming potentials and other distinguishing characteristics.

At a minimum, the charge must be set at a level that creates a mitigation incentive (i.e. equal to or greater than the average costs of abatement). Funds recovered from this charge can be funnelled into government-led methane mitigation strategies.

Queensland has already demonstrated its capability to treat environmental harm in accordance with the polluter pays principle, through its policies on the management of Per- and Polyfluorinated Substances (**PFAS**), which have as guidelines, "those who hold stocks or produce PFAS pollution should bear the costs of managing it to prevent damage to human health or the environment. This, together with the precautionary approach, is an underlying rationale for determining responsibilities and actions under the protocol."¹⁶⁷ These existing frameworks can assist with the preparation of a methane-specific protocol.

¹⁶⁴ The Rio Declaration on Environment and Development (1992), Principle 16.

¹⁶⁵ IEA Policy Tracker, *Inflation Reduction Act 2022: Sec. 60113 and Sec. 50263 on Methane Emissions Reductions*. Accessed: [Inflation Reduction Act 2022: Sec. 60113 and Sec. 50263 on Methane Emissions Reductions – Policies - IEA](#).

¹⁶⁶ New South Wales Environmental Protection Agency, *Load-based licencing*, 14 July 2021. Accessed: <https://www.epa.nsw.gov.au/licensing-and-regulation/licensing/environment-protection-licences/load-based-licensing>.

¹⁶⁷ Queensland Government, *PFAS Contamination Protocol 2019*.

VIII. ANNEXURE A – REGULATION OF METHANE IN 2023 COAL AND GAS MINING EA CONDITIONS

Table 1 – Methane Conditions in 2023 Coal Mining EAs

	Environmental Authority	Date EA takes effect	Type of mining	Proponent & Project Name	Approved Activities	EA Conditions Relating to Methane Emissions
1.	EA230202 (EA0002465)	2 February 2023	Open cut	COKING COAL ONE PTY LTD BROADMEADOW EAST COAL MINE	<ul style="list-style-type: none"> • Mining black coal • Mining activity involving drilling, costeaming, pitting or carrying out geological surveys 	
2.	EPML00817713	2 February 2023	Open cut	NC COAL COMPANY PTY LIMITED NEWLANDS COAL MINE	<ul style="list-style-type: none"> • Mining black coal • Chemical Storage • Mineral processing • Waste disposal • Sewage Treatment 	
3.	EPML01470513	14 February 2023	Open cut	ADANI MINING PTY LTD CARMICHAEL COAL MINE	<ul style="list-style-type: none"> • Mining black coal • Storing chemicals of combustible liquids • Storing chemical of solids and gases • Extracting and screening other than by dredging • Mineral processing • Waste disposal • Sewage treatment 	
4.	EPML00586713	27 February 2023	Underground	AQUILA COAL PTY LTD EAGLE DOWNS COAL MINE	<ul style="list-style-type: none"> • Mining black coal • Petroleum or GHG storage activity • Storage of chemicals • Electric generation • Fuel burning • Mineral processing • Resource recovery • Sewerage treatment • Water treatment 	
5.	EPML00959213	2 March 2023	Underground	FITZROY (CQ) PTY LTD CARBOROUGH DOWNS COAL MINE	<ul style="list-style-type: none"> • Mining black coal • Mineral processing • Waste disposal • Sewerage treatment 	
6.	EPML00337613	7 March 2023	Open cut	JAX COAL PTY LTD JAX COAL MINE	<ul style="list-style-type: none"> • Mining activity involving drilling, costeaming, pitting or carrying out geological surveys • Mining black coal • Waste disposal 	
7.	EA0002346	15 March 2023	Open cut/ Drill holes	ANGLO AMERICAN STEELMAKING COAL PTY LTD	<ul style="list-style-type: none"> • Exploration permit coal 	

	Environmental Authority	Date EA takes effect	Type of mining	Proponent & Project Name	Approved Activities	Conditions Relating to Methane Emissions
8.	EPPR00819713	17 March 2023	Open cut	MAGNETIC SOUTH PTY LTD	<ul style="list-style-type: none"> • Mining activity involving drilling, costeaning, pitting or carrying out geological surveys 	
9.	P-EA-100316883	3 April 2023	Open cut Bulk sampling using small box cuts	CONSTELLATION MINING PTY LTD STAR COAL PROJECT	<ul style="list-style-type: none"> • A mining activity involving drilling, costeaning, pitting or carrying out geological surveys • investigating the potential development of a mineral resource by large bulk sampling or constructing an exploratory shaft, adit or open pit • Chemical storage • Fuel burning • Crushing, milling, grinding or screening • Waste disposal • Sewage treatment 	
10.	EPPR00203513	12 April 2023	Open cut	WANDOAN HOLDINGS PTY LIMITED, SCAP WANDOAN PTY LTD	<ul style="list-style-type: none"> • Non-Scheduled, Mining Activity, Mineral Development Licence 	<p>Hazardous contaminants The holder of the environmental authority must plan and conduct activities on site to prevent any potential or actual release of a hazardous contaminant.</p> <p>(“Hazardous contaminant condition”)</p> <p>EP Act, Schedule 4 hazardous contaminant means a contaminant, other than an item of explosive ordnance, that, if improperly treated, stored, disposed of or otherwise managed, is likely to cause serious or material environmental harm because of— (a) its quantity, concentration, acute or chronic toxic effects, carcinogenicity, teratogenicity, mutagenicity, corrosiveness, explosiveness, radioactivity or flammability; or (b) its physical, chemical or infectious characteristics</p> <p>Section 11 EP Act: A "contaminant" can be— (a) a gas, liquid or solid; or (b) an odour; or</p>

	Environmental Authority	Date EA takes effect	Type of mining	Proponent & Project Name	Approved Activities	Conditions Relating to Methane Emissions
						(c) an organism (whether alive or dead), including a virus; or (d) energy, including noise, heat, radioactivity and electromagnetic radiation; or (e) a combination of contaminants.
11.	EPML00661913	17 April 2023	Open cut	HAIL CREEK COAL HOLDINGS PTY LIMITED, SUMISHO COAL DEVELOPMENT QUEENSLAND PTY LTD, MARUBENI COAL PTY LTD HAIL CREEK COAL MINE	<ul style="list-style-type: none"> • Mining black coal • Chemical storage • Mineral processing • Waste disposal • Sewerage treatment 	
12.	EPML00712313	5 May 2023	Open cut	STANMORE SMC PTY LTD SOUTH WALKER CREEK MINE	<ul style="list-style-type: none"> • Sewerage treatment • A mining activity involving drilling, costeaning, pitting or carrying out geological surveys • Mining black coal • Waste disposal • Mineral processing • Resource recover • Chemical storage 	
13.	EPML00595013	11 May 2023	Open cut	BYERWEN COAL PTY LTD BYERWEN COAL MINE	<ul style="list-style-type: none"> • Mining black coal • A mining activity involving drilling, costeaning, pitting or carrying out geological surveys • Chemical storage • Fuel burning • Mineral processing • Crushing, milling, grinding or screening 	
14.	EPSX00602113	29 May 2023	Open cut	HAIL CREEK COAL HOLDINGS PTY LIMITED, MARUBENI RESOURCES DEVELOPMENT PTY LTD. SUMISHO COAL DEVELOPMENT QUEENSLAND PTY LTD	<ul style="list-style-type: none"> • Non-Scheduled Mining Activity, Mineral Development Licence 	
15.	EPML00900113	1 June 2023	Open cut	SYNTECH RESOURCES PTY LTD CAMEBY DOWNS MINE	<ul style="list-style-type: none"> • Mining black coal • Mineral processing • Waste disposal • Sewerage treatment 	
16.	EPML00819213	12 June 2023	Both	METRES PTY LTD MILLENNIUM MINE	<ul style="list-style-type: none"> • Mining black coal • Drilling • Manufacturing chemicals (explosives) 	

	Environmental Authority	Date EA takes effect	Type of mining	Proponent & Project Name	Approved Activities	Conditions Relating to Methane Emissions
					<ul style="list-style-type: none"> • Chemical storage • Waste disposal • Sewage treatment 	
17.	EPML00318213	29 June 2023	Open cut	QCT MINING PTY LTD, MITSUBISHI DEVELOPMENT PTY LTD, QCT RESOURCES PTY LIMITED, BHP QUEENSLAND COAL INVESTMENTS PTY LTD, QCT INVESTMENT PTY LTD, UMAL CONSOLIDATED PTY LTD, BHP COAL PTY LTD PEAK DOWNS MINE	<ul style="list-style-type: none"> • Metal recovery • Mining black coal • Waste disposal • Chemical storage • Sewerage treatment • Mineral processing • Regulated waste storage 	
18.	EPML00561913	29 June 2023	Open cut	QCT MINING PTY LTD, MITSUBISHI DEVELOPMENT PTY LTD, QCT RESOURCES PTY LIMITED, BHP QUEENSLAND COAL INVESTMENTS PTY LTD, QCT INVESTMENT PTY LTD, UMAL CONSOLIDATED PTY LTD, BHP COAL PTY LTD DAUNIA MINE	<ul style="list-style-type: none"> • Mining black coal • Chemical storage • Mineral processing • Resource recovery • Sewerage treatment 	
19.	EPML00862313	29 June 2023	Open cut	QCT MINING PTY LTD, MITSUBISHI DEVELOPMENT PTY LTD, QCT RESOURCES PTY LIMITED, BHP QUEENSLAND COAL INVESTMENTS PTY LTD, QCT INVESTMENT PTY LTD, UMAL CONSOLIDATED PTY LTD, BHP COAL PTY LTD SARAJI MINE	<ul style="list-style-type: none"> • Chemical storage • Mineral processing • Waste disposal • Sewerage treatment 	
20.	EPML00657913	3 July 2023	Underground	CONSTELLATION MINING PTY LTD	<ul style="list-style-type: none"> • Mining black coal • Chemical storage • Gas production manufacturing, processing or reforming • Tyre manufacturing • Mineral processing • Resource recovery • Sewerage treatment 	
21.	EPML00634113	10 July 2023	Open cut	GS COAL PTY LTD, J-POWER AUSTRALIA PTY LTD, J.C.D. AUSTRALIA PTY LTD CLERMONT OPEN CUT COAL MINE	<ul style="list-style-type: none"> • Chemical storage • Mineral processing • Waste disposal • Sewerage treatment • Mining black coal 	

	Environmental Authority	Date EA takes effect	Type of mining	Proponent & Project Name	Approved Activities	Conditions Relating to Methane Emissions
22.	EPML00335713	17 February 2023	Open cut	NEW ACLAND COAL PTY LTD NEW ACLAND COAL MINE	<ul style="list-style-type: none"> • Mining black coal • Chemical storage • Mineral processing Waste disposal • Sewerage treatment • Water treatment 	
23.	EPPR00939813	28 July 2023	Underground	ANGLO COAL (GROSVENOR) PTY LTD, EXXARO AUSTRALIA PTY LTD MORANBAH SOUTH PROJECT	<ul style="list-style-type: none"> • A mining activity involving drilling, costeaning, pitting or carrying out geological surveys 	Hazardous contaminant condition
24.	EPML00565813	3 August 2023	Open cut	ANGLO COAL (DAWSON) LIMITED, MITSUI MOURA INVESTMENT PTY LTD DAWSON CENTRAL AND NORTH MINE	<ul style="list-style-type: none"> • Resource recovery • Sewerage treatment 	
25.	EPML00657413	3 August 2023	Open cut	ANGLO COAL (DAWSON SOUTH) LIMITED T/A ANGLO COAL (DAWSON SOUTH) PTY LTD, MITSUI MOURA INVESTMENT PTY LTD	<ul style="list-style-type: none"> • Mining black coal 	
26.	EPML00732613	3 August 2023	Both	JENA PTY LTD, ANGLO COAL (ROPER CREEK) PTY LTD, MARUBENI RESOURCES DEVELOPMENT PTY LTD, MITSUI GERMAN CREEK INVESTMENT PTY LTD, ANGLO COAL (GERMAN CREEK) PTY LTD, GERMAN CREEK MINE	<ul style="list-style-type: none"> • Mining black coal • Chemical storage • Fuel burning • Waste disposal • Sewerage treatment • Water treatment • Extraction and screening • Crushing, milling, grinding or screening • Mineral processing 	
27.	EPML00739113	3 August 2023	Open cut	ANGLO COAL (GERMAN CREEK) PTY LTD, JENA PTY LTD, MITSUI GERMAN CREEK INVESTMENT PTY LTD	<ul style="list-style-type: none"> • Mining black coal • Chemical storage • Extraction and screening • Resource recovery and transfer facility operation • Sewerage treatment 	
28.	EPML00987013	3 August 2023	Underground	MORANBAH NORTH COAL PTY LTD, MITSUI MORANBAH NORTH INVESTMENT PTY LTD, JFEMA MORANBAH NORTH PTY LTD, SHINSHO MORANBAH COAL PTY LTD, NS COAL (MORANBAH NORTH) PTY LTD, NS MORANBAH NORTH PTY LTD GROSVENOR COAL MINE	<ul style="list-style-type: none"> • Petroleum or GHG storage activity • Mining black coal • Chemical storage • Gas Producing Manufacturing • Crushing, milling, grinding or screening • Crushing, grinding, milling or screening • Resource recover • Sewerage treatment 	

	Environmental Authority	Date EA takes effect	Type of mining	Proponent & Project Name	Approved Activities	Conditions Relating to Methane Emissions
29.	EPML00720413	7 August 2023	Open cut	BATCHFIRE CALLIDE PTY LTD, BATCHFIRE CALLIDE NO. 2 PTY LTD, CALLIDE COAL MINE	<ul style="list-style-type: none"> • Mining black coal • Chemical storage • Crushing, milling, grinding or screening • Sewerage treatment 	
30.	EPML00744813)	11 August 2023	Open cut	CAML RESOURCES PTY LTD, NIPPON STEEL AUSTRALIA PTY LIMITED, FOXLEIGH COAL PTY LTD, FOXLEIGH MINE	<ul style="list-style-type: none"> • Mining black coal • Mineral processing • Chemical storage • Fuel burning • Extractive and screening activities • Crushing, milling grinding or screening • Regulated waste storage • Waste disposal 	
31.	EA0000990	24 August 2023	Open cut Bulk sampling	CIVIL & MINING RESOURCES PTY LTD, LD DAWSON PTY LTD	<ul style="list-style-type: none"> • Investigating the potential development of a mineral resource by large bulk sampling or constructing an exploratory shaft, adit or open pit 	Hazardous contaminants condition
32.	EA0001299	5 September 2023	Underground	FITZROY (CQ) PTY LTD, NEBO CENTRAL COAL PTY LTD	<ul style="list-style-type: none"> • Mining black coal • Chemical storage • Sewerage treatment 	<p>Power station contaminant limits (air) Unless venting is authorised under the <i>Petroleum and Gas (Production and Safety) Act 2004</i> or the <i>Petroleum Act 1923</i>, waste gas must be flared in a manner that complies with the following requirements:</p> <p>a) an automatic ignition system is used, and b) a flame is visible at all times while the waste gas is being flared, and c) there are no visible smoke emissions other than for a total period of no more than 5 minutes in any 2 hours, or d) it uses an enclosed flare</p>

Table 2 - Methane Conditions in 2023 Petroleum and Gas Mining EAs

No	Environmental Authority	Date EA takes effect	Proponent & Project Name	Activities	Conditions Relating to Methane Emissions
1.	EPPG00662213	2 January 2023	BRONCO ENERGY PTY LIMITED KGLNG E & P II PTY LTD PAPL (UPSTREAM II) PTY LIMITED TOTALENERGIES EP AUSTRALIA III	Petroleum activities <ul style="list-style-type: none"> • Extraction of groundwater • Construction of wells • Drilling activities • Stimulation & injection activities • Pipeline activities 	Unless venting is authorised under the <i>Petroleum and Gas (Production and Safety) Act 2004</i> or the <i>Petroleum Act 1923</i> , waste gas must be flared in a manner that complies with all of (X1(a)) and (X1(b)) and (X1(c)), or with (X1(d)): <ul style="list-style-type: none"> (a) an automatic ignition system is used, and (b) a flame is visible at all times while the waste gas is being flared, and (c) there are no visible smoke emissions other than for a total period of no more than 5 minutes in any 2 hours, or (d) it uses an enclosed flare. <p>(“Flaring Condition”)</p> <p>The administering authority must be notified through the Pollution Hotline as soon as reasonably practicable, but within 48 hours after becoming aware of any of the following events:</p> <p>...</p> <ul style="list-style-type: none"> (b) unauthorised releases of volumes of contaminant, in any mixture, to land greater than: <ul style="list-style-type: none"> i. 200 L of hydrocarbons; or <p>(“Hydrocarbon Notification Condition”)</p>
2.	EPPG00839513	24 January 2023	BNG (SURAT) PTY LTD	Petroleum activities <ul style="list-style-type: none"> • GHG Storage activities 	Hydrocarbon Notification Condition
3.	EPPG00340313	2 February 2023	TRI-STAR GILBERT PTY LTD	Petroleum activities <ul style="list-style-type: none"> • Stimulation activities • Exploration activities 	Hydrocarbon Notification Condition
4.	EPPG00885313	8 February 2023	AUSTRALIA PACIFIC LNG PTY LIMITED AUSTRALIA PACIFIC LNG CSG MARKETING PTY LIMITED	Petroleum activities <ul style="list-style-type: none"> • Injection activities • Sewage treatment 	Gas reinjection must not result in: <ul style="list-style-type: none"> (a) fracturing the target formation; (b) surface migration of the injected gas; ... (e) fugitive emissions. <p>Hydrocarbon Notification Condition</p>

No	Environmental Authority	Date EA takes effect	Proponent & Project Name	Activities	Conditions Relating to Methane Emissions
5.	EPPG03516115	1 March 2023	PZE (SURAT) PTY LTD ARMOUR ENERGY (SURAT BASIN) PTY LTD	Petroleum activities <ul style="list-style-type: none"> Petroleum exploration, appraisal and development wells Low consequence dams Stimulation activities Extracting, other than by dredging	Flaring Condition Hydrocarbon Notification Condition
6.	EPPG03516415	1 March 2023	PZE (SURAT) PTY LTD	Petroleum activities <ul style="list-style-type: none"> Petroleum exploration, appraisal and development wells Low consequence dams Stimulation activities Extracting, other than by dredging	Flaring Condition Hydrocarbon Notification Condition
7.	BRPG002	3 March 2023	BRIDGEPORT ENERGY (QLD) PTY LIMITED	Petroleum activities – Authority to Prospect	Flaring Condition
8.	P-EA-100388639	3 March 2023	BRIDGEPORT ENERGY (QLD) PTY LIMITED LEIGH CREEK OIL & GAS PTY LTD	Petroleum activities – Authority to Prospect	Flaring Condition
9.	EPPG00477413	17 March 2023	STATE GAS LIMITED	Petroleum activities <ul style="list-style-type: none"> CSG and conventional appraisal wells Seismic	
10.	P-EA-100374981	2 March 2023	SANTOS QNT PTY. LTD. COMET RIDGE MAHALO PTY LTD	Petroleum activities Surveying	
11.	P-EA-100272018	28 March 2023	ARROW CSG (AUSTRALIA) PTY LTD AUSTRALIAN CBM PTY LTD CLEANCO QUEENSLAND LIMITED	Petroleum activities Pipeline license	
12.	P-EA-100316985	17 April 2023	SENEX COMPRESSION FACILITY PTY LTD	Petroleum activities <ul style="list-style-type: none"> Gas Compression Facility Power Station	Hydrocarbon Notification Condition
13.	EPML00658213	26 May 2023	QUEENSLAND ENERGY RESOURCES (AUSSUN) PTY LIMITED QUEENSLAND ENERGY RESOURCES (NO.1) (STUART) PTY LIMITED QUEENSLAND ENERGY RESOURCES (NO.2) (STUART) PTY LIMITED	Petroleum Activities Shale to Liquids Technology Demonstration Plant	Condition B14: All flares are to be operated to optimize combustion and minimize likelihood of smoky emissions and odours. Condition H35: Leak detection and repair program During periods of operation, including when hydrocarbons are stored, the holder of this environmental authority must conduct a leak detection and repair program for all pump and compressor seals, valves, and pipe flanges. Condition H36: The leak detection and repair program does not apply to:

No	Environmental Authority	Date EA takes effect	Proponent & Project Name	Activities	Conditions Relating to Methane Emissions
					... (e) any item handling gases containing more than 90 % methane and or hydrogen.
14.	EPPG00878413	26 May 2023	CNOOC COAL SEAM GAS COMPANY PTY LTD TOKYO GAS QCLNG PTY LTD AUSTRALIA PACIFIC LNG PTY LIMITED BG INTERNATIONAL LTD SGA (QUEENSLAND) PTY LIMITED QGC PTY LIMITED	Petroleum activities Chemical Storage Electricity generation Sewage treatment <ul style="list-style-type: none"> Water treatment 	Hydrocarbon Notification Condition
15.	EPPG00694213	8 June 2023	ARMOUR ENERGY (SURAT BASIN) PTY LTD	Petroleum activities <ul style="list-style-type: none"> Conventional gas production and exploration wells Petroleum pipeline Stimulation activities Waste disposal Operating fuel burning equipment Hydrocarbon gas refining Chemical storage 	Flaring Condition Hydrocarbon Notification Condition
16.	EPPG00787513	22 June 2023	AUSTRALIA PACIFIC LNG PTY LIMITED DENISON GAS (QUEENSLAND) PTY LTD	Petroleum activities <ul style="list-style-type: none"> Petroleum production and exploration Stimulation activities Operating fuel burning equipment Extracting material Waste disposal 	Emissions that may cause material or serious environmental harm and not specifically authorised by this environmental authority must not be released from the authorised petroleum activities/ beyond the boundary of the activity except where they are authorised under this environmental authority. (“Harm Condition”) As soon as practicable after becoming aware of any emergency or incident which results in emissions not in accordance with the conditions of this environmental authority, or a contravention of a condition of this environmental authority, the holder of this environmental authority must notify the administering authority of the release by telephone or facsimile and in writing within 14 days following the initial notification (“Unauthorised Emissions Notification Condition”)

No	Environmental Authority	Date EA takes effect	Proponent & Project Name	Activities	Conditions Relating to Methane Emissions
					Hydrocarbon Notification Condition
17.	EPPG00652513	11 July 2023	QGC PTY LIMITED BG INTERNATIONAL LIMITED CNOOC COAL SEAM GAS COMPANY PTY LTD TOKYO GAS QCLNG PTY LTD	Petroleum activities <ul style="list-style-type: none"> • Petroleum exploration, appraisal and development wells • Limited petroleum activities • Compressor stations • Fuel burning equipment • Sewage treatment • Regulated waste disposal 	Harm Condition Condition A13: Subject to condition (A13), the holder of this environmental authority is required to report in the case of uncontained spills of contaminants (including but not limited to hydrocarbon, CSG water or mixtures of both) of the following volumes or kind: (a) releases of any volume of contaminants to water; and (b) releases of volumes of contaminants greater than 200L of liquid hydrocarbon, 2000 litres of brine or 10 000 litres of coal seam gas water to land; and (c) releases of any volumes of contaminants where potential serious or material environmental harm has occurred or may occur. Condition I5: The holder of this authority must: (a) ensure that the injection of coal seam gas and tracer gases into the reservoirs prescribed in Condition (I1) do not deteriorate the quality of groundwaters or contaminate registered water bores; (b) develop and implement measures to minimise the risk of blowouts, explosions or ingress to buildings/ structures that may represent an explosion hazard; (c) monitor the impact of injection pressures to prevent fracturing, breakouts and fugitive emissions; (d) continuously record injection pressure, flow rate, and cumulative volume of the injected gas; (e) ensure that any tracer gas sampling is undertaken and analysed by a competent third party;

No	Environmental Authority	Date EA takes effect	Proponent & Project Name	Activities	Conditions Relating to Methane Emissions
					(f) in the event of an anomalous pressure or volume recording, inform the administering authority within 24 hours of the occurrence; and (g) in the event of contamination of groundwaters, develop and submit to the administering authority a plan to rehabilitate the groundwaters prior to the commencement of any rehabilitation work.
18.	EPPG00611313	12 July 2023	QGC PTY LIMITED BG INTERNATIONAL LIMITED CNOOC COAL SEAM GAS COMPANY PTY LTD STARZAP PTY LTD AUSTRALIA PACIFIC LNG PTY LIMITED TOKYO GAS QCLNG PTY LTD SGA (QUEENSLAND) PTY LIMITED	Petroleum Activities <ul style="list-style-type: none"> • Seismic activities • Wells • Compressor stations • Sewage Treatment • Gathering network • Power Lines 	Emissions Testing Conditions Hydrocarbon Notification Condition
19.	EPPG00972513	24 July 2023	ARROW ENERGY PTY LTD ARROW (TIPTON TWO) PTY LTD ARROW (TIPTON) PTY. LTD. ARROW CSG (AUSTRALIA) PTY LTD ARROW (DAANDINE) PTY. LTD	Petroleum activities <ul style="list-style-type: none"> • Coal seam gas wells, including core wells, exploration wells, development wells and production wells • Injection wells • Compressor units • Central gas processing facilities • Water treatment • Sewage Treatment • Power station 	Flaring Condition Hydrocarbon Notification Condition
20.	P-EA-100464322	24 July 2023	AUSTRALIAN CBM PTY LTD ARROW CSG (AUSTRALIA) PTY LTD CLEANCO QUEENSLAND LIMITED	Petroleum activities <ul style="list-style-type: none"> • Coal seam gas wells, including core wells, exploration wells, development wells and production wells • Sewage Treatment 	Flaring Condition Hydrocarbon Notification Condition
21.	P-EA-100298483	31 July 2023	AUSTRALIA PACIFIC LNG PTY LIMITED	Petroleum activities – Data acquisition	Flaring Condition
22.	EA0001503	4 August 2023	AUSTRALIA PACIFIC LNG PTY LIMITED	Petroleum activities <ul style="list-style-type: none"> • Pipeline license 	
23.	P-EA-100303749	4 August 2023	AUSTRALIA PACIFIC LNG CSG TRANSMISSIONS PTY LIMITED	Petroleum activities <ul style="list-style-type: none"> • Surveying 	
24.	P-EA-100359157	4 August 2023	AUSTRALIA PACIFIC LNG CSG PROCESSING PTY LIMITED	Petroleum activities <ul style="list-style-type: none"> • Surveying 	

No	Environmental Authority	Date EA takes effect	Proponent & Project Name	Activities	Conditions Relating to Methane Emissions
25.	EPPG00968013	11 August 2023	AUSTRALIA PACIFIC LNG PTY LIMITED	Petroleum activities <ul style="list-style-type: none"> • Coal seam gas production and exploration • Petroleum facility • Petroleum pipeline • Stimulation activities • Extracting material • Electricity generation • Operating fuel burning equipment • Chemical storage • Sewage treatment • Waste disposal • Water treatment 	Flaring Condition Hydrocarbon Notification Condition Condition F9: All reasonable and practicable measures must be taken in the design and operation of the plant to minimise fugitive VOC [volatile organic compound] emissions. Reasonable and practicable measures include but are not limited to: a) implementation of a monitoring program to regularly leak test all units/components including pumps, piping and controls, vessels and tanks; and b) operating, maintenance and management practices to be implemented to mitigate fugitive VOC sources
26.	EPPG00881613	14 August 2023	SANTOS GLNG PTY LTD KGLNG LIQUEFACTION PTY LTD TOTAL GLNG AUSTRALIA PAPL (DOWNSTREAM) PTY LIMITED	Petroleum activities <ul style="list-style-type: none"> • Pipeline 	Hydrocarbon Notification Condition
27.	EPPG00928713	25 August 2023	SANTOS TOGA PTY LTD TOTALENERGIES EP AUSTRALIA KGLNG E&P PTY LTD TOTALENERGIES EP AUSTRALIA II SANTOS QUEENSLAND, LLC PAPL (UPSTREAM) PTY LIMITED SANTOS TPY CSG CORP.	Petroleum activities <ul style="list-style-type: none"> • Coal seam gas exploration, appraisal and development wells • Stimulation activities • Injection wells • Gathering and transmission lines • Compressor stations • Water treatment • Sewage treatment 	Flaring Condition Hydrocarbon Notification Condition
28.	P-EA-100314975	31 August 2023	ARROW ENERGY PTY LTD ARROW CSG (AUSTRALIA) PTY LTD	Petroleum activities <ul style="list-style-type: none"> • Water monitoring 	Flaring Condition