SUBMISSION

Submission to the Climate Change Authority

Submission to the Inquiry into accelerate reductions in fossil methane emissions

7 August 2026

The Australian Academy of Technological Sciences and Engineering (ATSE) is a Learned Academy of independent, non-political experts helping Australians understand and use technology to solve complex problems. Bringing together Australia's leading thinkers in applied science, technology and engineering, ATSE provides impartial, practical and evidence-based advice on how to achieve sustainable solutions and advance prosperity.

ATSE supports an ambitious science and engineering-led pathway to net zero emissions by 2050. Current international policy settings are projected to result in global warming of around 2.8°C above pre-industrial levels by the end of this century (UNEP 2025a). Achieving these targets and lowering peak global temperatures will require Australia to urgently adopt and apply an evidence-based approach grounded in climate science, the most effective and practical technologies, and the needs of the national population and economy. ATSE's Pathways to Australian decarbonisation highlights the importance of continued investment in research, development, and the commercialisation of technologies to critical to reducing emissions from non-energy and hard-to-abate sectors (ATSE 2026).

Methane is a potent greenhouse gas with a relatively short atmospheric lifetime of around 12 years (IEA 2026). Fugitive emissions of fossil methane from the coal and gas sectors released through leaks, venting and flaring, come from a relatively small number of concentrated emitters. Reductions in fossil methane emissions made today can have a measurable impact on warming within the next decade. Hence, methane abatement remains one of the fastest and most effective opportunities to deliver near-term climate benefits and would help reduce peak global temperatures (ATSE 2023). Deep reductions in methane emissions would result in a lower peak warming temperature than the equivalent reduction in carbon dioxide. In this context, ATSE supports the Climate Change Authority's position of considering methane's near-term climate impacts through a 20-year Global Warming Potential (GWP-20) metric in addition to the 100-year Global Warming Potential (GWP100) metric.

Mature technologies already exist to reduce most fugitive emissions. The International Energy Agency (2026) highlights that roughly 70% of methane emissions from fossil fuels can be abated with existing technology. Further research into technological advances, including the use of Artificial Intelligence to optimise monitoring systems, could improve leak detection accuracy and timeliness. Australia's current challenge is to incentivise the uptake of these abatement measures and develop technologies to abate the last 30%. Measures that improve greater regulatory consistency across jurisdictions, enhance emission data transparency and invest in emerging technologies for methane reduction would therefore support Australia's emissions reduction goals. ATSE makes the following recommendations:

Recommendation 1: Develop a centralised near-real-time methane platform.

Recommendation 2: Develop a national regulatory framework that mandates regular methane leak detection and repair (LDAR) nationwide.

Recommendation 3: Increase investment in research and development for emerging methane monitoring and abatement technologies.

The value of a national near-real-time methane platform

Accurate and robust emissions data enables timely, transparent decision-making. Near real-time methane emissions information can improve public visibility of emissions and energy flows across operations and production activities in Australia. It can also support tracking progress toward Australia's emission reduction commitments, assessing compliance, and informing the design, implementation and evaluation of domestic emission reduction policies and programs. The Australian Government hosts a range of publicly accessible, aggregated greenhouse gas emissions datasets such as National Greenhouse Accounts and associated National Greenhouse and Energy Reporting (NGER) data.

However, these datasets are limited by the lack of near-real-time, spatially explicit, facility-level emissions data, which would enable independent verification. Current reporting does not require independent measurements of atmospheric greenhouse gas (GHG) emission, limiting emission factors-based estimates. Complementing existing reporting approaches with independent atmospheric measurements to detect and quantify fugitive methane emissions, alongside the development of a national methane emission monitoring platform, would be an important next step. Such a platform would allow the rapid detection of accidental leaks, enabling faster intervention to minimise emissions. A national near-real-time methane platform, which integrates and visualises data from satellite, airborne, and ground-based measurement technologies and practices, could also support higher data quality, transparency and visualisation.

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Satellite-derived data has enhanced transparency around emissions sources, especially for very large methane plumes (UNEP 2025b). Australian based international research is already testing atmospheric measurement technologies and practices to quantify controlled methane releases in a simulated Australian open-cut coal mine (UNEP 2025c). Australia can build on this research and leverage the atmospheric methane data generated through the project to develop a national methane monitoring platform that integrates satellite, aerial and ground-based observations with modelling.

Centralising this data onto a single platform would enhance their utility and support boarder research and policy development. Improved access to information and greater data transparency can strengthen accountability for both operators and regulators (IEA 2021a). Initiatives such as OpenMethane demonstrate the feasibility of a national near-real-time methane monitoring system. Building on these efforts, the approach proposed here would involve broader stakeholder participation and buy-in. This could increase confidence in emissions data and encourage more timely, evidence-based, public debate on Australia's emissions reduction priorities, helping to accelerate the uptake of fossil methane abatement opportunities.

Recommendation 1: Develop a centralised near-real-time methane platform.

National regulatory framework on methane leak detection and repair program

There are countless examples of engineering failures and poor operational controls leading to large methane emissions events (Carrington 7 March 2023). Timely detection and remediation of these failures can significantly reduce fugitive methane emissions (IEA 2021a). Clean Air Task Force (2026) estimates that well-designed and properly implemented leak detection and repair (LDAR) programs can reduce methane emissions from leaks by nearly 80%.

National standardised practices for operators to inspect, locate, report and repair fugitive leaks, supported by the Australian Government, could help to reduce Australia's fugitive methane emissions. Responsibility for implementing fugitive methane LDAR programs currently rests with state and territory regulators, resulting in a fragmented regulatory approach. ATSE has previously advocated for mandatory periodic disclosure by operators of the facility conditions, environmental risks and impacts, and leakage from both active and decommissioned infrastructure (ATSE 2025). Deploying these measures would not require new technological breakthroughs nor the establishment of an emissions baseline (IEA 2021b). Rather, it requires Australia to adopt a whole-of nation regulatory approach that clearly outlines compliance obligations, establishes effective enforcement mechanisms, and provides proportionate penalties for non-compliance. A national framework would also promote more consistent environmental outcomes across jurisdictions. Where operators would bear the cost of inspections and repairs, a mandatory LDAR program would also help halt the costs associated with methane leakage being passed on to the public.

Australia would not be starting from scratch in establishing a national LDAR framework. In Canada, federal regulations (SOR/2018-66) require onshore oil and gas companies to implement a LDAR or the equivalent program that detect, monitor and repair methane leaks. Similarly, the European Union's Methane Regulation (EU 2024/1787) mandates LDAR programs for energy sector operators, including those responsible for decommissioned facilities, broadening accountability beyond domestic production. Australia currently lacks a mandatory nationwide LDAR framework, relying instead on a mix of state legislation, licence conditions and annual NGER reporting obligations. A nationally consistent LDAR framework would promote methane mitigation on regular intervals.

Recommendation 2: Develop a national regulatory framework that mandates regular methane leak detection and repair nationwide.

Invest in the research and development of emerging technologies that accelerate methane emissions abatement

In addition to policy reforms, a range of emerging technologies has the potential to reshape methane abatement landscape. Ongoing advances in high-resolution satellite technology are expanding methane detection and quantification capabilities. Improved satellite systems that better account for variable wind conditions and provide more frequent observations of the same region could enhance the detection of diffusion of spatially dispersed emissions from industrial operations (Chauhan and Raval 2025). Similarly, AI-

driven leak detection systems linked to visual gas detection cameras are being trialled in GS Energy facilities in South Korea (Teledyne FLIR 7 April 2026).

On the prevention side, other emerging technologies, including biological methane destruction, advancements in ventilation systems and novel sealing materials are also under development to reduce methane emissions.

Collectively these detection and abatement technologies could help Australia to eliminate the approximately 30% of methane emissions for which there is no current, commercially deployable, technology. Realising this potential will require ongoing investment in research, development, demonstration and commercialisation by both government and industry. This investment should cover the full innovation pipeline, from early-stage research through to large scale-deployment. This will allow Australia to continue to reduce its methane emissions over the long term, as it progresses towards its 2050 net zero target. As such, continued investment in emerging methane monitoring and abatement technologies is a national priority.

Recommendation 3: Increase investment in research and development for emerging methane monitoring and abatement technologies.

ATSE thanks the Climate Change Authority for the opportunity to respond to the consultation on how Australia can accelerate reductions in fossil methane emissions. For further information, please contact academypolicyteam@atse.org.au.

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