

INQUIRY INTO EMISSIONS FROM THE FOSSIL FUEL SECTOR

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Overview of Submission: Inquiry into Fossil Fuel Emissions

This submission argues that a significant "**credibility gap**" exists between the legislated targets of the NSW *Climate Change (Net Zero Future) Act 2023* and the state's ongoing approval and inadequate regulation of the fossil fuel sector. It contends that without urgent, systemic reform, NSW's 2030, 2035, and 2050 emissions reduction targets are unattainable.

1. Conflict with Climate Law (ToR a)

The submission establishes a direct conflict between the legally binding emissions targets set by the *Net Zero Future Act* and the state's continued approval of new and expanded fossil fuel projects. Since the Paris Agreement, NSW has approved 23 coal and gas projects, locking in an estimated **3.2 billion tonnes of future emissions** (Scope 1, 2, and 3). This trajectory is fundamentally at odds with the Act's mandate for "rapid and deep" emissions cuts, creating significant legal and governance risks for future project approvals.

2. The Methane Measurement Crisis (ToR b)

A central argument is the systemic failure of the current emissions reporting framework. Key points include:

- **Massive Under-reporting:** Independent satellite analysis reveals that actual fugitive methane emissions from NSW coal mines are at least **double the officially reported figures**.
 - **Flawed Methodology:** The National Greenhouse and Energy Reporting (NGER) scheme allows for estimation-based methods (Method 1 and 2) that are shown to be inaccurate and easily manipulated, rather than requiring direct, empirical measurement.
 - **Near-Term Climate Impact:** The submission advocates for using the **20-year Global Warming Potential (GWP20)** for methane, which shows it is over 80 times more potent than CO₂, to accurately reflect its impact on the state's near-term 2030 and 2035 targets. The current 100-year metric understates this urgency.
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3. A Flawed Planning System (ToR c)

The NSW planning system is identified as a key barrier to climate action. The submission argues it is "legislatively engineered" to ignore the full climate impact of projects by:

- Relying on the same flawed, proponent-led emissions data that under-reports methane.
 - Legislatively prohibiting decision-makers from considering **Scope 3 emissions** (emissions from the combustion of exported fuels), which are the largest component of a project's climate impact. This was a direct response to the landmark *Rocky Hill* court case.
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4. The Abatement Opportunity (ToR d)

Proven, effective, and economically viable technologies exist to abate a significant portion of fugitive methane emissions, particularly Ventilation Air Methane (VAM) from underground coal mines. However, a purely voluntary, incentive-based approach has failed. The submission argues that a **strong regulatory mandate** requiring the installation of Best Available Control Technology is necessary to overcome industry inaction.

5. Economic Costs and Opportunities (ToR e)

The document outlines the severe economic consequences of continued inaction versus the benefits of an accelerated transition.

- **Costs of Inaction:** The NSW economy is already bearing escalating costs from climate-related disasters, with Treasury projecting annual costs to reach **\$17 billion by 2061**.
- **Opportunity Costs:** Continuing to support fossil fuels means forgoing the significant job creation potential of renewable energy. For example, replacing the Eraring power station's capacity with solar would create over **14,000 construction jobs**, compared to just 1,566 for new gas.
- **Social Cost of Carbon:** The submission recommends embedding a "social cost of carbon" into all planning decisions to ensure the immense damage costs of GHG emissions are properly accounted for, a principle already adopted by NSW Treasury for public investments.

Submission to the Joint Standing Committee on Net Zero Future: Inquiry into Emissions from the Fossil Fuel Sector

Introduction: The Credibility Gap Between Climate Ambition and Fossil Fuel Reality

This submission addresses the critical and widening disconnect between the State of New South Wales's legislated climate ambitions and the ongoing, unabated reality of greenhouse gas (GHG) emissions from its fossil fuel sector. The passage of the *Climate Change (Net Zero Future) Act 2023*¹ marked a pivotal moment, establishing a legal framework for decarbonisation and aligning the state with the global scientific consensus on the urgency of climate action. However, this submission will demonstrate that without urgent and fundamental reform of how the state measures, reports, regulates, and approves fossil fuel activities, the guiding principles and legally binding targets of the Act are unattainable.

The central thesis of this submission is that a systemic crisis in emissions measurement, reporting, and verification (MRV), particularly concerning fugitive methane from coal and gas operations, has created a significant credibility gap. This gap is compounded by a state planning framework that remains misaligned with climate imperatives, continuing to approve new and expanded fossil fuel projects that lock in decades of future emissions. This disconnect not only jeopardises NSW's legislated 2030 and 2035 emissions reduction targets but also exposes the state to significant and escalating economic, legal, and social risks.

This document is structured to directly address the inquiry's Terms of Reference.⁴ It will begin by establishing the irreconcilable conflict between the state's climate law and the fossil fuel sector's current emissions trajectory. It will then present overwhelming evidence of the scale of the methane measurement problem, before critiquing the state's opaque emissions modelling and flawed planning approval processes. Finally, it will assess the feasibility of proven abatement technologies and quantify the immense economic costs of inaction versus

the opportunities of an accelerated transition. The submission concludes with a series of targeted, evidence-based recommendations for reform, designed to close the credibility gap and place NSW on a genuine path to achieving its net-zero future.

1. An Irreconcilable Conflict: Fossil Fuel Emissions and the Climate Change (Net Zero Future) Act 2023

This section addresses Term of Reference (a), establishing the fundamental incompatibility between the state's landmark climate legislation and the current scale and projected trajectory of emissions from the fossil fuel sector.

1.1 The Legislative Imperative: A Mandate for Action

The *Climate Change (Net Zero Future) Act 2023* (the Act) is not merely an aspirational policy document; it is a legally binding framework that codifies the state's commitment to climate action, giving effect to the international Paris Agreement.² The Act enshrines ambitious, science-based targets for the reduction of net greenhouse gas emissions in New South Wales, mandating:

- A reduction of at least 50% from 2005 levels by 30 June 2030.²
- A reduction of at least 70% from 2005 levels by 30 June 2035.²
- A reduction to net-zero emissions by 30 June 2050.²

Crucially, the Act establishes a set of "guiding principles" that must inform government action. These principles explicitly recognise the scientific consensus that human activity is causing climate change and that "action is urgently required".⁸ They state that there is a "critical need to act," that action should be taken "as early as possible to minimise the cost and adverse impacts of climate change," and that decisions should be based on the "best available science" while pursuing "best practice".³

To ensure accountability, the Act established the Net Zero Commission, an independent expert body tasked with monitoring, reviewing, and reporting on the state's progress towards its targets.¹ The Commission is empowered to provide independent advice on projects and policies to government departments and, significantly, to the Independent Planning Commission (IPC).³ This legislative architecture creates a clear and unambiguous mandate for all arms of government to pursue policies and make decisions that are consistent with a rapid

and deep decarbonisation trajectory.

1.2 The Sectoral Reality: A Collision Course with Legislated Targets

The emissions profile of the NSW fossil fuel sector stands in stark contrast to the legal imperatives of the Act. According to the latest available data, NSW's total net GHG emissions in 2021-22 were 111.0 million tonnes of carbon dioxide equivalent (CO2-e).⁹ The fossil fuel sector is the dominant source of these emissions. Stationary energy, which is overwhelmingly comprised of coal-fired power generation, remained the single largest emitting sector, contributing 39% of the state's total emissions.¹⁰ Fugitive emissions from the extraction and processing of coal and gas represent another major source, officially accounting for 9% of total emissions in 2019, or 13 megatonnes (

Mt) of CO2-e.¹¹

Despite the state's climate commitments and the clear scientific imperative, the NSW planning system has continued to approve new and expanded fossil fuel projects. An analysis by the Australian Conservation Foundation found that since the Paris Agreement came into force in late 2016, NSW authorities have approved 23 coal and gas projects.¹² The lifetime emissions from these approved projects—encompassing direct emissions (Scope 1), emissions from energy use (Scope 2), and emissions from the final combustion of the exported fuel (Scope 3)—are estimated to be at least 3.2 billion tonnes of

CO2-e.¹² This is equivalent to more than six times Australia's entire national annual emissions.

This continued expansion of the fossil fuel industry is fundamentally at odds with the "rapid and deep decrease in GHG emissions" that the NSW Land and Environment Court, in the landmark *Gloucester Resources v Minister for Planning* (Rocky Hill) case, identified as being "urgently needed".¹³ The Net Zero Commission's own 2024 Annual Report has already warned that the state's 2030 and 2035 targets are "at risk of not being met," a clear indictment of the failure of current policy settings to drive the required level of decarbonisation.¹⁴

Metric	Value (Mt CO2-e)	Source
Legislated Targets (vs. 2005)		

2030 Emissions Reduction Target	50% reduction	Climate Change (Net Zero Future) Act 2023 ²
2035 Emissions Reduction Target	70% reduction	Climate Change (Net Zero Future) Act 2023 ²
Current Emissions Reality		
2021-22 Total NSW Emissions	111.0	DCCEEW ⁹
2019 Fugitive Emissions (Official)	13.0	NSW Government ¹¹
Fugitive Methane (Satellite Estimate)	Significantly higher than official figures	Ember ¹⁵
Lifetime Emissions (Post-Paris Approvals)	~3,200 (Scope 1, 2 & 3)	Australian Conservation Foundation ¹²

Table 1: NSW Climate Targets vs. Fossil Fuel Sector Emissions Reality. This table starkly illustrates the conflict between the state's legally mandated emissions reduction targets and the ongoing scale of emissions from the fossil fuel sector, including the vast quantity of future emissions locked in by recent project approvals.

1.3 The Looming Legal and Governance Crisis

The enactment of the *Climate Change (Net Zero Future) Act 2023* has created a direct and unavoidable legal tension that is precipitating a governance crisis. On one hand, the Act establishes statutory duties and objectives, mandating specific, science-based emissions reduction outcomes.² On the other hand, the state's planning and regulatory frameworks continue to enable and approve the primary driver of the emissions problem: the expansion of the fossil fuel industry.¹² This fundamental contradiction sets the stage for significant legal challenges against government decisions that are demonstrably inconsistent with the Act's principles and targets.

The process that will bring this conflict to a head is already in motion. The Net Zero Commission is empowered to "independently monitor, review and report on progress" and

provide advice to decision-making bodies like the IPC.¹ As the scientific evidence of massive under-reporting of methane emissions—detailed in the next section of this submission—becomes undeniable, the Commission's annual reports will inevitably be forced to conclude that NSW is far further from achieving its targets than official data suggests. This will expose a stark contradiction: the government will be shown to be failing to meet its own legally mandated targets.

Such a failure could be interpreted as a breach of the Act's guiding principles, particularly the requirements to take action based on the "best available science" and to pursue "best practice" in addressing climate change.² Consequently, any future approval of a major new or expanded fossil fuel project by the IPC or the relevant Minister will become highly vulnerable to legal challenge. The grounds for such a challenge would be that the decision is fundamentally incompatible with the statutory purpose and explicit targets of the Act. The legislation has sharpened the legal tools available, moving potential litigation beyond broad common law arguments to a direct and potent question of statutory compliance. The continued approval of high-emitting projects in the face of this legislation is not just poor policy; it is a legally perilous course of action.

2. A Problem of Measurement: The True Scale of Fugitive Methane Emissions

This section addresses Term of Reference (b), presenting overwhelming scientific evidence of systemic under-reporting of fugitive methane emissions from the NSW fossil fuel sector. It argues that the current framework for quantification, reporting, and assessment is not fit for purpose and requires a fundamental overhaul to align with scientific reality and international best practice.

2.1 The Under-reporting Crisis: A Chasm Between Official Data and Scientific Reality

A large and growing body of independent, peer-reviewed scientific research demonstrates a profound chasm between the official fugitive methane emissions figures reported by the fossil fuel industry and the actual concentrations measured in the atmosphere. These studies, utilising advanced technologies such as satellite remote sensing and aerial surveys, consistently find that actual emissions are drastically higher than the estimates submitted

under the Commonwealth's National Greenhouse and Energy Reporting (NGER) scheme.

The implications for NSW are severe. A 2025 satellite analysis by the global energy think tank Ember examined key coal mining clusters in NSW and Queensland that account for 79% of Australia's black coal production. It identified methane emissions 40% greater than officially reported national totals.¹⁵ The findings for NSW were particularly alarming. The study analysed clusters in the Hunter Valley and Illawarra regions, covering approximately 60–64% of the state's coal output. Within this limited area, it identified methane emissions at

twice the level that was officially reported for the *entire state* in 2021.¹⁵ This suggests that the state's true fugitive methane emissions from coal mining are at least double the official figures, and likely significantly more.

These findings are not isolated. The Superpower Institute, using its Open Methane tool, concluded that Australia's coal mines and gas fields may be emitting "around double" the amount of methane they declare, identifying specific "sites of concern" in NSW, including the Mount Pleasant and Narrabri Underground mine areas.¹⁹ The International Energy Agency (IEA) has also estimated that Australia's coal mine methane emissions are around double the officially reported figures.²²

Case studies of individual mines, which use the same flawed reporting methodologies available to NSW operators, reveal the scale of potential inaccuracies at the facility level. Aerial surveys of Glencore's Hail Creek mine in Queensland found that actual emissions, if sustained, could be three to eight times higher than the operator's reported annual average.²³ Other satellite-based studies estimated emissions from the same mine were between 10 and 13 times greater than what was reported to regulators.²⁵ This pattern of profound discrepancy points not to isolated errors, but to a systemic failure in the reporting methodology itself.

Data Source / Study	Coverage	Estimated Annual Methane Emissions (tonnes)	Discrepancy vs. Reported	Key Finding
Official NGER Inventory (NSW, 2021)	Full State	339,000	Baseline	Official self-reported figure from all mines.
Ember Satellite Analysis (2021)	Hunter/Illawarra Clusters	~702,000	2.07x higher than reported	"Fugitive emissions

18	(~64% of production)		(for only part of the state)	levels more than twice as high as officially reported, while only incorporating half the state's coal production."
Superpower Institute Estimate ¹⁹	National (inc. NSW sites)	"Around double"	~2x higher than reported	Identifies 20 "sites of concern" in QLD, NSW, and VIC with emissions 1.2 to 8 times higher than reported.
IEA Methane Tracker ²⁷	National	~1.67 million (2022)	~1.82x higher than reported	Indicates Australia is under-reporting its coal mine methane emissions by 82%.

Table 2: Methane Emissions in NSW Coal Basins - Reported vs. Measured Reality. This table aggregates findings from key scientific reports to illustrate the significant and consistent discrepancy between official, industry-reported methane emissions and independent, measurement-based estimates.

2.2 The Flaw in the Method: How NGER Institutionalises Under-estimation

The systemic under-reporting crisis is a direct consequence of the flawed methodologies permitted under the NGER framework. The scheme allows open-cut coal mines, which are a

major source of fugitive emissions, to use estimation-based methods rather than requiring direct, empirical measurement of the methane being released.²²

- **Method 1** uses generic, state-based emission factors, which are simple averages that do not account for the vast geological variability between different mines and even different seams within the same mine.²³
- **Method 2** allows companies to develop their own site-specific emissions models based on a limited number of borehole samples. While presented as more accurate, this method has perversely led to a dramatic *decrease* in reported emissions at the mines that have adopted it.²⁹

Evidence from company reporting shows that when mines in NSW and Queensland have switched from the state-based Method 1 to the site-specific Method 2, their reported emissions have plummeted. For example, reported emissions for BHP's Caval Ridge mine and Whitehaven's Maules Creek mine dropped by 90% and 60% respectively after the change.³⁰ Research from energy insights firm Reputex estimates that the shift to company-led Method 2 estimates has consistently decreased reported fugitive emissions by 65-70%.²⁹ This is in direct and stark contradiction to the satellite and aerial data, which shows that actual emissions are far higher than even the original Method 1 estimates.

This discrepancy strongly suggests that the Method 2 framework is being exploited to generate favourable, artificially low emissions figures that do not reflect atmospheric reality. The Climate Change Authority itself has acknowledged this risk, stating in its review of the NGER scheme that the accuracy of reported fugitive methane emissions "may be impacted due to the use of lower order methods" and that simple emissions factors "do not adequately capture temporal or spatial specificity or variability at the facility level".³¹ The current system, far from ensuring accuracy, has institutionalised a mechanism for under-estimation.

The foundational weakness of this flawed reporting system is not merely a technical issue of accounting; it is the critical vulnerability that enables a cascade of policy failures. It creates a distorted and misleading picture of the state's emissions profile, which allows the government to claim progress towards its targets while the actual atmospheric burden of greenhouse gases is increasing far more rapidly than acknowledged. This flawed data then contaminates every subsequent policy decision. State emissions projections, which are used to track progress under the Net Zero Plan, are built upon this faulty NGER data.³² When these inaccurate projections are used in the planning system to assess the impact of new fossil fuel projects, the assessments are inherently flawed, leading to approvals based on a false premise of manageable climate impact.³³ This creates a dangerous feedback loop: bad data leads to bad policy and poor planning decisions, which in turn lock in more real-world emissions that are then under-reported, perpetuating the cycle of inaction. The entire architecture of the state's climate policy rests on this foundation of sand.

2.3 The Urgency of a 20-Year Lens: Why GWP100 Obscures the Real Threat

The method used to compare the warming impact of different greenhouse gases is a critical policy choice. Methane (CH₄) is a short-lived but extremely potent GHG. The Intergovernmental Panel on Climate Change (IPCC) quantifies its impact relative to carbon dioxide (CO₂) using the Global Warming Potential (GWP) metric over different time horizons.

The conventional standard used for national inventories and international agreements is the 100-year GWP (GWP100). Over this century-long timeframe, one tonne of methane is considered to have the same warming impact as approximately 28–30 tonnes of CO₂.³⁴ However, methane's atmospheric lifetime is only around 12 years.³⁵ This means its warming effect is intensely concentrated in the first two decades after its release.

To capture this critical near-term impact, the IPCC also provides a 20-year GWP (GWP20). Over this 20-year timeframe, one tonne of methane has the warming impact of over 80 tonnes of CO₂.¹⁹ Given that NSW has set urgent and legally binding emissions reduction targets for 2030 and 2035—well within this 20-year window—the GWP20 metric is far more relevant for assessing the true impact of the state's methane emissions on its ability to meet these critical goals.

Relying solely on the GWP100 metric systematically understates and obscures the immediate and intense warming impact of the fossil fuel sector. It creates a false sense of security and delays the perceived urgency of methane abatement. For NSW to have a scientifically credible climate policy that is genuinely aligned with its own near-term targets, it must adopt the GWP20 metric for all state-level emissions accounting, projections, and planning assessments.

Time Horizon	GWP Value (Potency vs. CO ₂)	Atmospheric Lifetime	Policy Implication for NSW
20 Years	~83x	~12 years	Accurately reflects the intense, short-term warming impact on the state's critical 2030 and 2035 targets.
100 Years	~30x	~12 years	Masks the

			near-term warming impact, diluting the urgency of methane abatement and misrepresenting the threat to interim targets.
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Table 3: Global Warming Potential (GWP) of Methane - A Tale of Two Timescales. This table clarifies the scientific basis for using GWP20 and its direct policy implications for NSW, highlighting how the choice of metric is a critical policy decision, not merely a scientific footnote.³⁵

2.4 Pathways to Credibility: Adopting International Best Practice in MRV

The solution to Australia's methane measurement crisis lies in adopting the rapidly emerging international best practices for Measurement, Reporting, and Verification (MRV).³⁷ The global standard is moving decisively away from estimation-based approaches and towards a system grounded in direct, empirical measurement.

The gold standard framework is the UN Environment Programme's Oil and Gas Methane Partnership 2.0 (OGMP 2.0).³⁸ This framework provides a clear pathway for companies to progress to the highest level of reporting (Level 5), which requires site-level, measurement-based emissions data that is reconciled with source-level estimates and verified by independent, accredited third parties.⁴⁰ This approach is supported by a new generation of high-resolution methane-detecting satellites, such as MethaneSAT, which are creating an unprecedented era of transparency and accountability.⁴¹

Australia's current NGER system is lagging significantly behind this global standard. It continues to rely on self-reported, company-led estimates that are demonstrably inaccurate and are not subject to rigorous, independent atmospheric verification.²⁷ To restore credibility to its emissions inventory and provide a sound basis for climate policy, NSW must advocate for, and where possible mandate within its own jurisdiction, a shift to an MRV system consistent with the principles and rigour of the OGMP 2.0 framework.

3. Planning for Failure: Emissions Modelling and Project Approvals

This section addresses Term of Reference (c), examining the transparency and integrity of emissions modelling and its use in the NSW planning system. It argues that the system is characterised by opaque modelling and a legislatively mandated failure to consider the full climate impact of fossil fuel projects, rendering it incapable of making decisions consistent with the state's net-zero objectives.

3.1 Opaque Models and Inconsistent Application

The NSW planning system relies on emissions modelling and projections, both at a state-wide level to track progress and at a project-specific level to assess the impacts of major developments.³² While the NSW Environment Protection Authority (EPA) provides guidance documents, such as the "Approved methods for the modelling and assessment of air pollutants" and the "NSW Guide for Large Emitters," the application of these frameworks to greenhouse gases has been inconsistent and lacks the necessary rigour to prevent approvals of projects that are incompatible with climate targets.³³

Proponents of major projects are required to prepare a greenhouse gas assessment, but the underlying models and assumptions often lack full transparency and are not subject to robust, independent verification. The system essentially relies on proponent-led assessments, which, as demonstrated by the fugitive methane crisis, are prone to generating favourable rather than accurate outcomes. Furthermore, these guides do not establish prohibitive emissions thresholds; they merely require an assessment, which does not preclude a project from being approved regardless of its climate impact. Since 2016, this system has overseen the approval of 23 fossil fuel projects, locking in billions of tonnes of future emissions.¹²

3.2 The Blind Spot of Scope 3 Emissions

The most significant failure of the NSW planning system is its treatment of Scope 3 emissions—the downstream emissions that occur when the state's fossil fuels are transported

and combusted, typically overseas. For NSW coal, these Scope 3 emissions are the overwhelming majority of the product's total climate impact, estimated to be around 500 million tonnes of CO₂-e annually, an amount nearly four times larger than all of NSW's direct domestic emissions combined.⁴⁶

In 2019, the NSW Land and Environment Court delivered a landmark judgment in the *Gloucester Resources v Minister for Planning* (Rocky Hill) case. Chief Judge Preston found that the Scope 3 emissions of the proposed coal mine were a relevant and crucial consideration. He ruled that the project was "at the wrong time" because its total GHG emissions would "increase global total concentrations of GHGs at a time when what is now urgently needed... is a rapid and deep decrease".¹³ This decision aligned the NSW planning system with the physical reality of climate science, which recognises that the atmosphere does not distinguish between the geographical source of emissions.

However, in direct response to the *Rocky Hill* judgment and similar findings by the IPC in the Bylong Valley case, the NSW Government intervened legislatively. In late 2019, it introduced and passed the *Environmental Planning and Assessment Amendment (Territorial Limits) Bill 2019*.⁴⁸ This legislation was explicitly designed to prohibit consent authorities from imposing conditions that relate to impacts or activities occurring outside of Australia. The stated intent was to prevent the regulation of Scope 3 emissions and restore "certainty" for the mining industry.⁴⁸ This act effectively stripped the IPC and other decision-makers of the power to fully account for the primary climate impact of new coal and gas projects.

3.3 Legislating for Climate Incoherence

The legislative intervention to sideline Scope 3 emissions represents a moment of profound and damaging policy incoherence. It demonstrates a deliberate choice by the government of the day to prioritise the facilitation of fossil fuel exports over the state's own climate objectives and the undisputed scientific reality of global carbon budgets. This action has embedded a fundamental contradiction at the very heart of the NSW planning system.

The scientific basis of the *Rocky Hill* decision was sound; it established the undeniable causal link between a single project's total emissions (including Scope 3) and the global climate crisis.¹³ The atmosphere is a single, shared system, and emissions from burning NSW coal in another country have the same warming effect as if they were released in the Hunter Valley. The court's decision represented a logical and necessary alignment of the planning system with this scientific reality.

The subsequent legislative amendment did not, and could not, disprove this science. Instead, it simply legislated that a significant and scientifically proven portion of a project's climate

impact must be ignored by decision-makers for political and economic reasons.⁴⁸ This has created an absurd and untenable situation. On one hand, the

Climate Change (Net Zero Future) Act commits NSW to making its contribution to achieving the goals of the Paris Agreement. On the other hand, the *Environmental Planning and Assessment Act* has been amended to force decision-makers to ignore the largest and most significant contribution NSW fossil fuel projects make to undermining that very same agreement.

The broader implication is that the planning system can no longer function as a neutral arbiter of a project's environmental merits. It has been legislatively skewed to favour fossil fuel developments by forcing decision-makers to wear climate blinders. This legislated incoherence ensures that the planning system will continue to approve projects that are fundamentally incompatible with the state's legally binding climate targets, guaranteeing a failure to meet them.

4. The Abatement Opportunity: Technology, Feasibility, and Political Will

This section addresses Term of Reference (d), assessing the implementation and feasibility of greenhouse gas abatement technologies. It demonstrates that proven, effective, and economically viable solutions to significantly reduce methane emissions from coal mining already exist but are not being deployed at scale due to critical policy and regulatory failures.

4.1 Proven Technologies Awaiting Deployment

A substantial portion of the NSW fossil fuel sector's direct emissions comes from fugitive methane, particularly Ventilation Air Methane (VAM) from underground coal mines. VAM alone accounts for approximately 8.9% of NSW's total Scope 1 emissions, representing one of the largest and most concentrated single sources of methane in the state.⁵⁰

Fortunately, a suite of mature and effective technologies exists to abate these emissions. The primary method involves oxidising the dilute methane in the ventilation air, converting it into CO₂ and water. As CO₂ has a GWP over 100 years that is approximately 28-30 times lower than methane, this process results in a massive reduction in the overall climate impact.⁵¹ Key

proven technologies include:

- **Regenerative Thermal Oxidisers (RTOs):** These systems use a heated ceramic bed to maintain a combustion chamber at approximately 1000°C, achieving methane destruction efficiencies of over 99%.⁵⁰ RTOs are a commercially available, tested solution and have been successfully deployed in Australia.⁵²
- **Catalytic Systems:** CSIRO has developed world-leading catalytic technologies, such as VAMMIT and CataVAM, which operate at much lower temperatures (440-550°C). These systems are safer, have a smaller footprint, and can operate self-sustainingly at the very low methane concentrations (as low as 0.13%) typical of many Australian mines.⁵⁰

These technologies are not experimental novelties. Commercial-scale projects have been successfully operated in NSW, most notably the West Cliff Ventilation Air Methane Project (WestVAMP), which ran from 2007 to 2017. This project used RTO technology to abate VAM and cogenerate 6 MW of electricity, reducing GHG emissions by 2 million tonnes of CO₂-e over its life.⁵³ The technology is proven, the feasibility is demonstrated, yet widespread adoption has not followed.

4.2 Overcoming the Economic Hurdles

The primary barrier to the widespread deployment of VAM abatement is not technological but economic, specifically the high upfront capital expenditure (CAPEX) required to install the systems.⁵⁶ For mining companies, this is a significant investment in an activity that is not their core business of extracting coal.

However, when viewed through a climate policy lens, VAM abatement is one of the most cost-effective large-scale emissions reduction opportunities available in the entire NSW economy. A 2021 assessment of abatement opportunities at NSW's gassiest underground mines found that 80 Mt CO₂-e of abatement was possible under business-as-usual conditions, with a further 110 Mt CO₂-e of potential abatement available with additional measures.⁵⁸

Multiple economic analyses confirm this cost-effectiveness. A recent CSIRO report found that approximately 25% of Australia's current coal-mine fugitive methane can be abated at an ongoing cost of less than A\$12 per tonne of \$CO₂\$-e.⁵¹ The Institute for Energy Economics and Financial Analysis (IEEFA) has cited costs for commercial-scale RTO projects as low as A\$9.24/tCO₂e.⁵⁶ The United Nations Economic Commission for Europe (UNECE) estimates a cost of around US

\$20 per tonne of \$CO₂\$ equivalent.⁵⁹ These figures are an order of magnitude cheaper than

other proposed technological solutions like carbon capture and storage (CCS), which is estimated to cost US\$100-150 per tonne of CO₂.⁵⁹

Despite this clear economic case for abatement from a public policy perspective, the current policy settings have failed to drive industry-wide uptake. Incentive schemes, such as grants from Coal Innovation NSW, have proven insufficient. For example, a \$15 million grant was awarded to establish a pilot VAM project, but the project ceased before full commercial deployment, highlighting the limitations of a purely voluntary, subsidy-based approach.⁵⁰

4.3 The Inefficiency of Incentive-Only Approaches

The history of VAM abatement in NSW provides a clear and compelling case study in the failure of a purely voluntary, incentive-based policy approach. The state is faced with a situation where a massive source of highly potent greenhouse gas emissions persists, despite the existence of proven, cost-effective technologies to eliminate it. The government has provided financial incentives to encourage uptake, yet widespread deployment has not occurred, and promising projects have stalled.⁵⁰

The logical conclusion is that for most mine operators, the financial return from a government grant is insufficient to overcome the CAPEX barrier and the perceived operational complexities, especially when there is no corresponding penalty for inaction. The economic calculation from the company's perspective is simple: why spend millions on non-core abatement technology when releasing the methane into the atmosphere is free?

This demonstrates that the most effective and efficient policy lever is not to offer more incentives, but to implement a strong regulatory mandate. By requiring all gassy underground mines to install and operate the best available abatement technology, the government would change the fundamental economic equation. The question for operators would shift from "Is it profitable to abate?" to "What is the most cost-effective way to comply with the law?". This approach internalises the cost of methane pollution and ensures that some of the cheapest and most significant emissions reductions available in the economy are finally realised. A failure to regulate is a choice to allow a massive, solvable emissions problem to continue unabated.

5. The Full Ledger: Economic Costs and Foregone Opportunities

This section addresses Term of Reference (e), providing a comprehensive analysis of the economic costs associated with ongoing greenhouse gas emissions from the fossil fuel sector. It details the direct and indirect costs from climate-related impacts already being borne by the NSW economy, as well as the significant opportunity costs incurred by delaying a decisive transition to a clean energy economy.

5.1 The Escalating Costs of Climate Inaction in NSW

The economic impacts of climate change, driven by fossil fuel emissions, are no longer a distant projection but a current and rapidly escalating cost to the NSW budget, businesses, and households.

- **Direct Costs from Extreme Weather:** The frequency and intensity of extreme weather events are imposing a heavy toll. Flooding alone is estimated to cost the NSW economy an average of \$250 million every year, a figure that is expected to increase as storm events become more severe.⁶¹ The 2019-20 "Black Summer" bushfires had an estimated national economic cost of over \$100 billion, with NSW being the most severely affected state.⁶³ Looking forward, the NSW Treasury itself projects that the annual economic cost of natural disasters to the state will treble from current levels to between \$16-17 billion by 2061.⁶⁴
- **Indirect and Systemic Costs:** Beyond the immediate costs of disaster response and recovery, climate change is imposing a range of systemic costs across the economy. These include skyrocketing insurance premiums in at-risk areas, with some properties becoming effectively uninsurable, which in turn affects property values and the ability to secure mortgages.⁶² The agricultural sector faces immense challenges, with projections showing that the agricultural output of the irrigated areas of the Murray-Darling Basin—which covers a large part of NSW—could be halved by 2050.⁶³ Furthermore, increased frequency of heatwaves is projected to lead to between 700,000 and 2.7 million lost work days annually by 2061, directly impacting productivity.⁶³
- **Fiscal and Financial Risks:** The state's public finances are also directly threatened. The combination of declining coal royalty revenue and the rising costs of climate adaptation and disaster recovery is projected to push NSW's net debt to 100% of Gross State Product by 2060.⁶⁴ This fiscal pressure, coupled with the physical risks of climate change, threatens the state's credit rating. A downgrade would increase borrowing costs for all public infrastructure, from hospitals and schools to transport projects, placing a further burden on taxpayers.⁶⁴

5.2 The Opportunity Cost: Forgoing the Clean Energy Jobs Boom

Continuing to approve and subsidise the fossil fuel industry comes at a significant opportunity cost by diverting capital, labour, and policy focus away from the rapidly growing clean energy sector. The persistent narrative that pits climate action against jobs is demonstrably false; the evidence clearly shows that renewable energy creates significantly more employment than fossil fuels per unit of energy produced.

An analysis by the Australian Conservation Foundation provides a stark comparison. It calculated the construction jobs that would be created by replacing the 2,880 MW generating capacity of the Eraring power station. The results show that a transition to renewables would create a jobs boom for regions like the Hunter Valley. Replacing Eraring's output with new gas-fired power plants would create just 1,566 jobs. In contrast, replacing it with utility-scale solar farms would create 14,415 jobs, and replacing it with rooftop solar would create a massive 63,562 jobs.⁶⁵

While the necessary transition away from coal mining will lead to job losses in that specific sector, comprehensive modelling by Net Zero Australia shows that the overall energy sector workforce is projected to grow five- to six-fold by mid-century. Crucially, every state and territory, including NSW, is projected to experience net job growth across each decade to 2060.⁶⁶ The key policy challenge is not a lack of future jobs, but the need for proactive government planning to ensure a just and orderly transition for workers and communities historically reliant on the coal industry.

Technology	Construction Jobs Created (to replace 2,880 MW output)
Rooftop Solar	63,562
Utility-Scale Solar Farm	14,415
Wind Farm	13,339
New Coal Plant	8,576
New Gas Plant	1,566

Table 4: Job Creation Comparison - Renewables vs. Fossil Fuels (Construction Phase). This table uses data from an analysis by the Australian Conservation Foundation to compare the number of construction jobs created to generate an equivalent amount of power to the Eraring power station, demonstrating the superior job creation potential of renewable energy technologies.⁶⁵

5.3 Valuing the Climate: The Case for a Social Cost of Carbon

A core economic failure of the current policy and planning framework is that it does not adequately account for the immense damage costs—or negative externalities—caused by each tonne of greenhouse gas emitted. The "social cost of carbon" is a well-established economic tool used globally to estimate these costs, encompassing impacts on public health, property damage from extreme weather, and lost agricultural productivity.⁶⁷

By formally embedding a robust, science-based social cost of carbon into the NSW planning system's assessment of all major projects, decision-makers would be required to internalise these external costs. This would provide a more accurate, transparent, and rational basis for decision-making, ensuring that the full economic ledger of a project is considered. The Australian Capital Territory has already adopted an interim social cost of carbon for its government operations.⁶⁸ Significantly, NSW Treasury now requires all government agencies to apply a "shadow carbon price"—starting at A\$130 per tonne and rising over time—when conducting cost-benefit analyses for public investments.⁶⁹ This is a clear acknowledgement from the state's own central economic agency that emissions have a real and substantial cost that must be factored into decision-making. It is imperative that this principle is now applied consistently and transparently to private sector projects via the planning system.

The prevailing economic narrative that forces a choice between climate action and economic prosperity is a false dichotomy. The evidence presented demonstrates that the current fossil fuel-dependent pathway constitutes a form of long-term economic self-harm for NSW. This path actively increases the state's exposure to the immense and growing physical and fiscal risks of climate change, with costs already running into the billions annually and projected to skyrocket.⁶¹ Simultaneously, this path causes NSW to miss out on the immense economic and employment opportunities of the global energy transition. Global markets are shifting decisively towards clean energy and low-carbon products. The emergence of Carbon Border Adjustment Mechanisms (CBAMs) in key export markets like the European Union will impose tariffs on carbon-intensive goods, directly threatening the viability of Australian exports and risking up to 20,000 jobs in NSW.⁷⁰ Therefore, every dollar of investment and every policy decision that continues to favour the fossil fuel sector is a double loss: it actively increases NSW's future liabilities while simultaneously representing a foregone opportunity to invest in

the industries that will provide sustainable growth, innovation, and employment for the future. It is a strategy that guarantees a less prosperous, less competitive, and more dangerous future for the state.

6. Conclusion and Strategic Recommendations

6.1 Synthesis of Findings

The evidence presented in this submission demonstrates a profound and urgent crisis at the heart of NSW's approach to climate change and the fossil fuel sector. A significant credibility gap has opened between the state's legally binding climate commitments and the reality of its emissions trajectory. The scale of emissions from the NSW fossil fuel sector, particularly the vastly under-reported fugitive methane, places the state on a path that is fundamentally incompatible with its own climate laws. The systems for measuring, reporting, and regulating these emissions are not fit for purpose, relying on flawed, estimation-based methodologies that obscure the true scale of the problem. This foundation of inaccurate data undermines the integrity of all subsequent climate policy, from state-level emissions projections to the federal Safeguard Mechanism. Compounding this failure is a planning framework that has been legislatively engineered to ignore the largest climate impacts of new fossil fuel projects, ensuring that decisions are made in a state of willful blindness to their full consequences. While proven and cost-effective technologies to abate a significant portion of these emissions exist, a lack of regulatory will has led to their neglect. This inaction imposes massive and escalating economic costs on the people of NSW and represents a catastrophic failure to seize the economic and employment opportunities of the global clean energy transition.

6.2 An Urgent Call for Reform

This inquiry by the Joint Standing Committee on Net Zero Future presents a critical and timely opportunity to confront this credibility gap and realign state policy with scientific reality and legal necessity. A failure to act decisively will not only guarantee that the state fails to meet its 2030 and 2035 targets but will also impose unacceptable and avoidable economic, social, and environmental costs on the people of New South Wales for generations to come. The

following recommendations provide a clear, evidence-based pathway for reform.

6.3 Recommendations for the Committee

It is recommended that the Joint Standing Committee on Net Zero Future urges the NSW Government to:

- Recommendation 1 (ToR b): Overhaul Methane Measurement, Reporting, and Verification (MRV).
Mandate the adoption of international best-practice MRV for all coal and gas facilities in NSW. This must require a transition from estimation-based reporting (NGER Methods 1 and 2) to site-level, direct measurement of methane emissions, verified by an accredited independent third party, consistent with the principles of the UN Oil and Gas Methane Partnership 2.0 (OGMP 2.0) framework.
- Recommendation 2 (ToR b): Adopt the 20-Year Global Warming Potential (GWP20) for State Policy.
Mandate the use of the 20-year Global Warming Potential (GWP20) for methane in all state-level emissions accounting, inventories, projections, and planning assessments. This will ensure policy and decision-making accurately reflect methane's intense near-term climate impact and its critical relevance to achieving the state's 2030 and 2035 targets.
- Recommendation 3 (ToR d): Mandate Methane Abatement.
Introduce regulations requiring all existing gassy underground coal mines to install and operate Best Available Control Technology for Ventilation Air Methane (VAM) abatement by 2027. Furthermore, require that all proposals for new or expanded open-cut coal mines demonstrate implementation of pre-drainage and gas capture where geologically feasible as a condition of approval.
- Recommendation 4 (ToR c): Reform Planning Laws for Climate Alignment.
Amend the Environmental Planning and Assessment Act 1979 to establish that consistency with the state's legislated emissions reduction targets under the Climate Change (Net Zero Future) Act 2023 is a primary and determinative consideration for all State Significant Development proposals. This should include repealing the 2019 amendments that limit the assessment and regulation of Scope 3 emissions, thereby allowing decision-makers to consider the full, scientifically-established climate impact of fossil fuel projects.
- Recommendation 5 (ToR e): Internalise the Economic Cost of Carbon in Planning Decisions.
Mandate the application of a robust, science-based Social Cost of Carbon in the statutory assessment and cost-benefit analysis of all new major projects in NSW, consistent with the principle already adopted by NSW Treasury for public investments.

This will ensure the external costs of climate pollution are internalised, leading to more rational and economically sound planning outcomes.

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The Credibility Gap

How NSW's Fossil Fuel Emissions Put Its Own Climate Laws at Risk

A Collision Course with Climate Law

The **Climate Change (Net Zero Future) Act 2023** sets legally binding targets for NSW. However, the continued approval of fossil fuel projects creates a trajectory that is fundamentally incompatible with these goals.

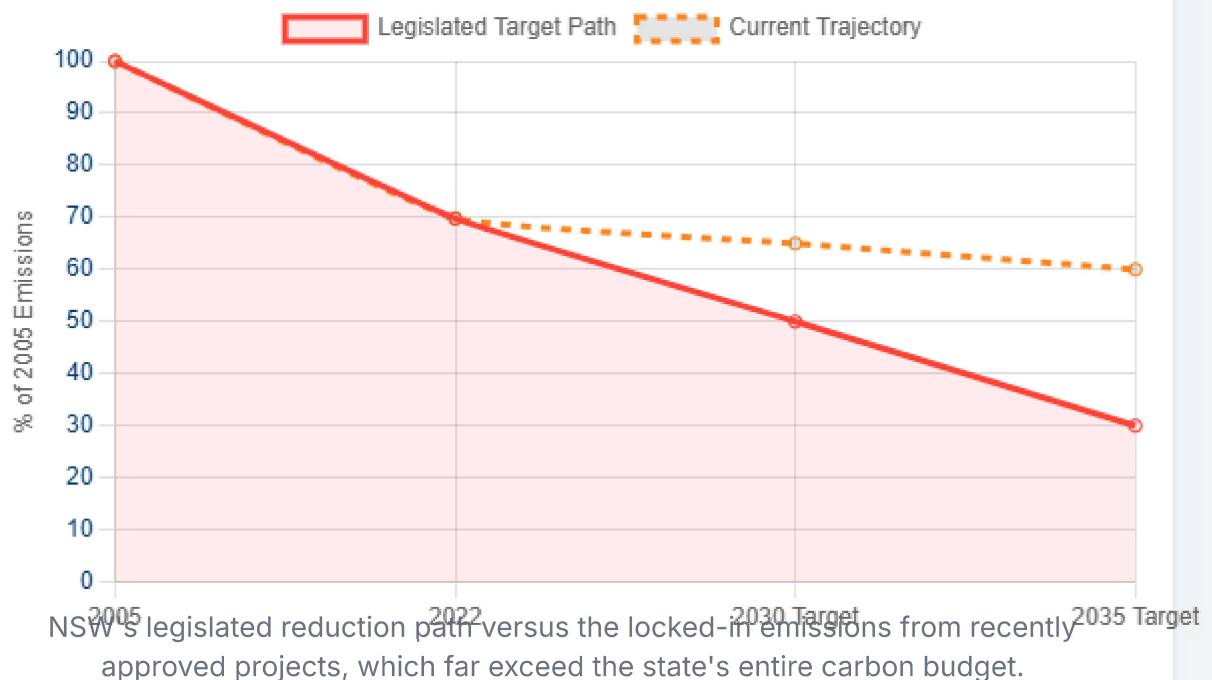
Legislated Emissions Targets

50%

Reduction by 2030

70%

Reduction by 2035



The Fossil Fuel Reality

3.2B

Tonnes of CO₂-e

Estimated lifetime emissions from 23 fossil fuel projects approved in NSW since the Paris Agreement came into force.

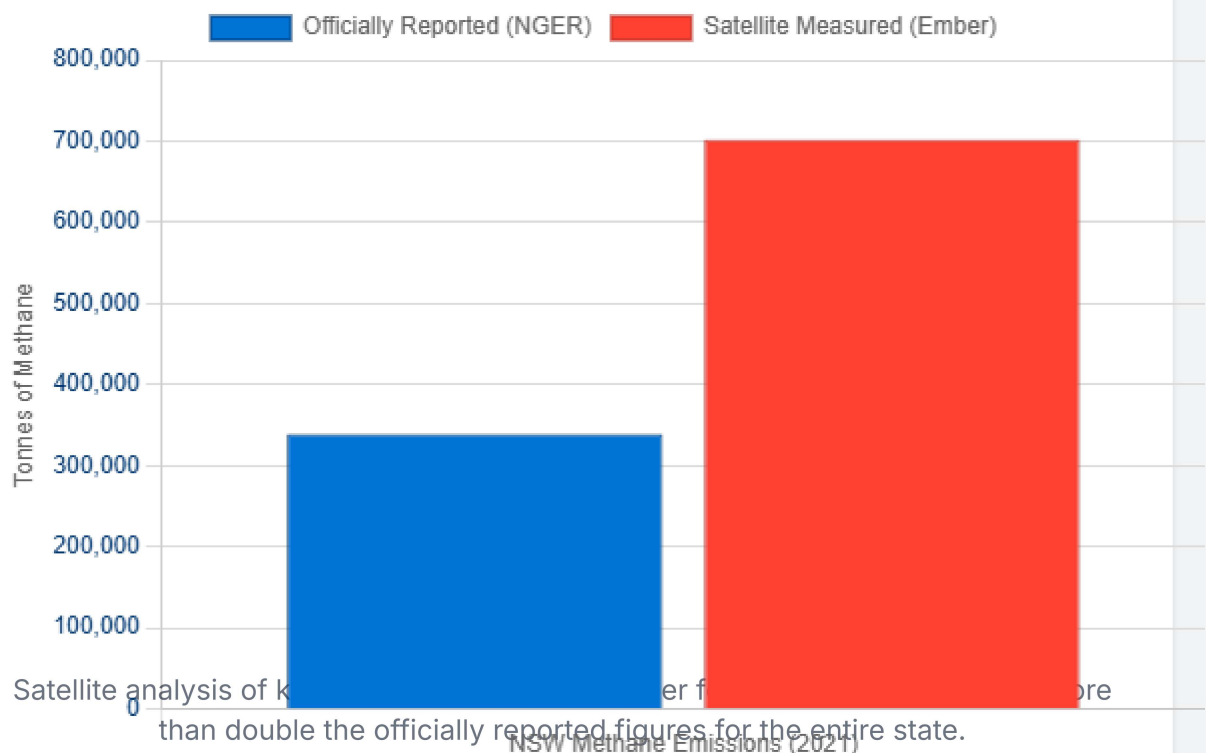


This creates a direct legal conflict with the Act's mandate for urgent and deep emissions cuts, exposing future project approvals to significant legal challenges.

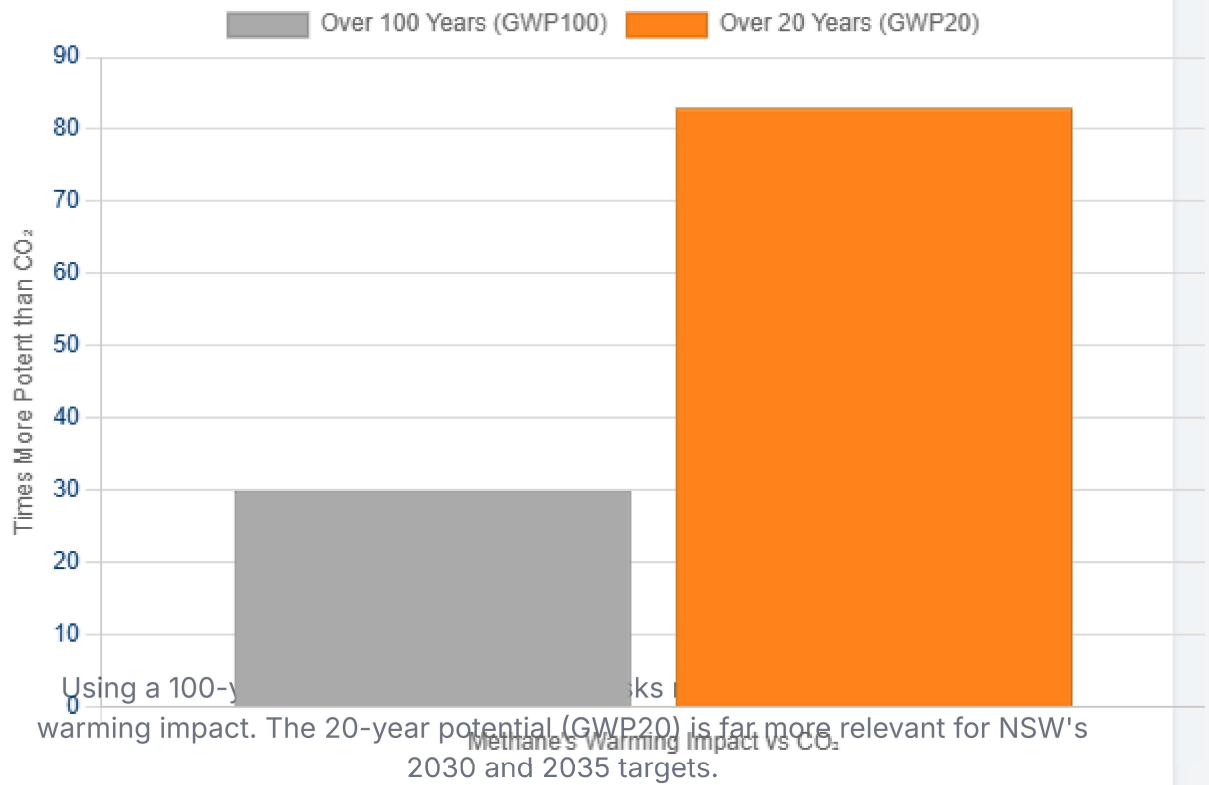
The Methane Measurement Crisis

There is a chasm between what fossil fuel companies report and what independent science measures. This flawed data undermines all of NSW's climate policies.

Reported vs. Measured Reality



The 20-Year Climate Threat



A Planning System Designed to Fail

The process for approving major projects is built on a foundation of flawed data and legislated blind spots, making it incapable of aligning with climate targets.



1. Flawed Data Input

System relies on industry self-reported NGER data, which satellite evidence shows vastly under-reports real-world methane emissions.



2. Opaque Modelling

This inaccurate data is fed into proponent-led environmental assessments with little independent verification.



3. Legislated Blind Spot

Planning law explicitly **prohibits** considering Scope 3 emissions (from burning the fuel), which is the largest climate impact.



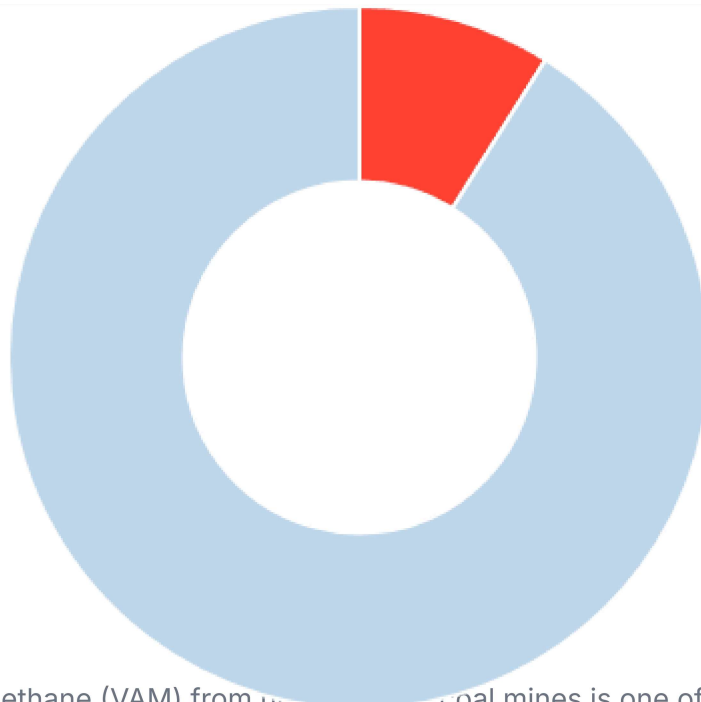
4. Incompatible Approvals

The result is continued approval of high-emitting projects that are fundamentally at odds with the state's climate laws.

The Abatement Opportunity

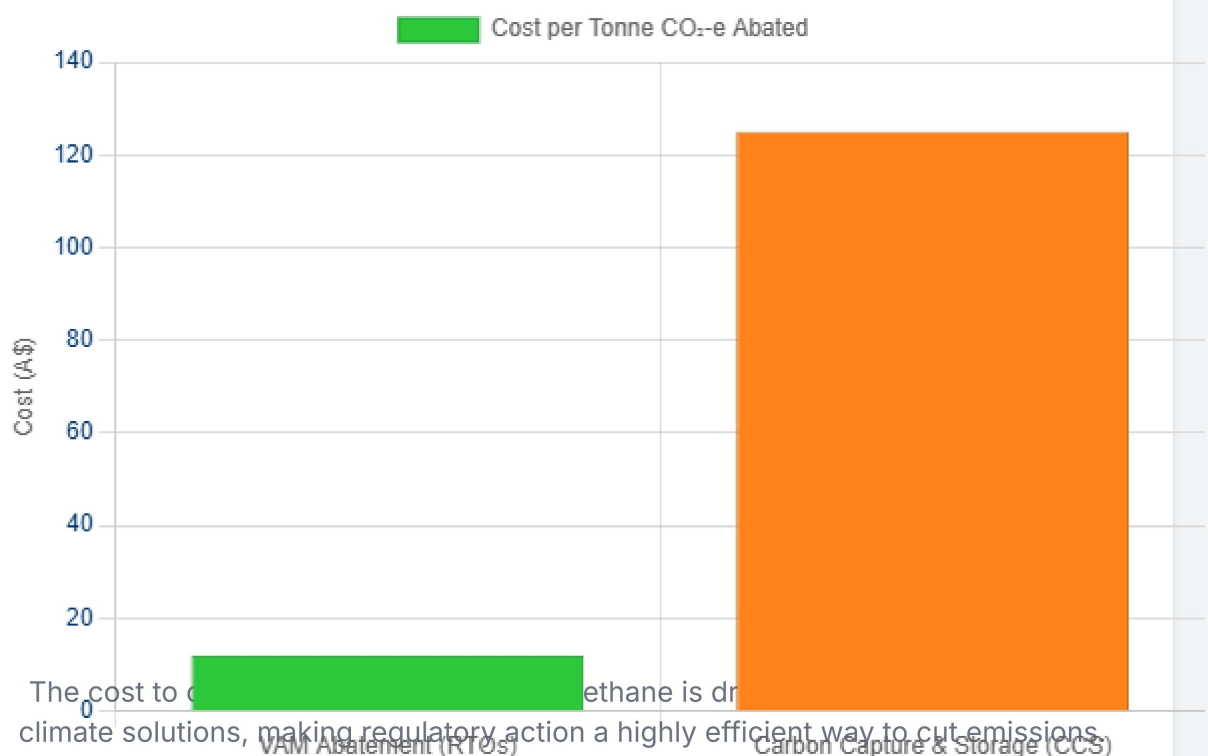
Proven, cost-effective technologies can eliminate a huge portion of fugitive methane emissions, but a lack of regulation means this low-hanging fruit is being ignored.

A Massive, Unchecked Source



Ventilation Air Methane (VAM) from underground coal mines is one of the largest single sources of methane in NSW, yet it is largely unabated.

A Cost-Effective Solution



The Economic Crossroads

Delaying climate action imposes huge costs on the NSW economy, while a decisive shift to renewables offers a massive jobs boom and a more prosperous

future.

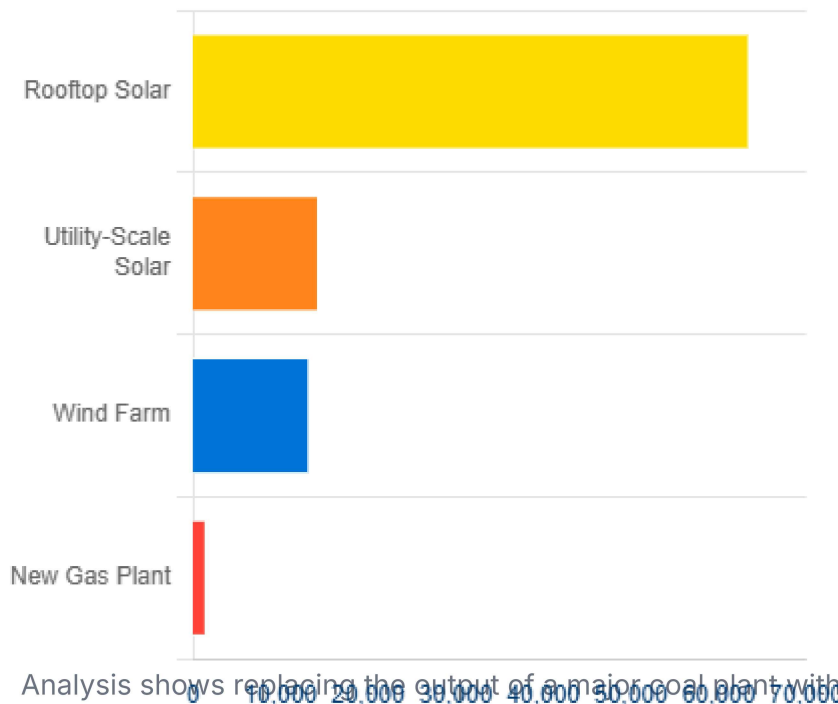
The Cost of Inaction

\$17B

Per Year

The projected annual cost of natural disasters to the NSW economy by 2061, according to NSW Treasury.

The Clean Energy Jobs Boom



Analysis shows replacing the output of a major coal plant with renewables creates thousands more construction jobs than replacing it with gas.

Valuing the Climate

\$130

Per Tonne

The "shadow carbon price" NSW Treasury already requires government agencies to use, acknowledging the real economic cost of emissions.

It's time to close the credibility gap.

NSW must align its measurement, planning, and regulatory systems with its climate laws to secure a prosperous and safe net-zero future.

The Future of Emissions in New South Wales

A data-driven look into the challenges and opportunities in aligning the fossil fuel sector with NSW's Net Zero future.

NSW's Net Zero Commitment: The Legislative Path

New South Wales has established a clear legal framework for climate action through the **Climate Change (Net Zero Future) Act 2023**. This legislation sets ambitious, binding targets for emissions reduction, creating a critical benchmark against which all industrial activity, especially from the fossil fuel sector, must be measured.

50%

Reduction by
2030

70%

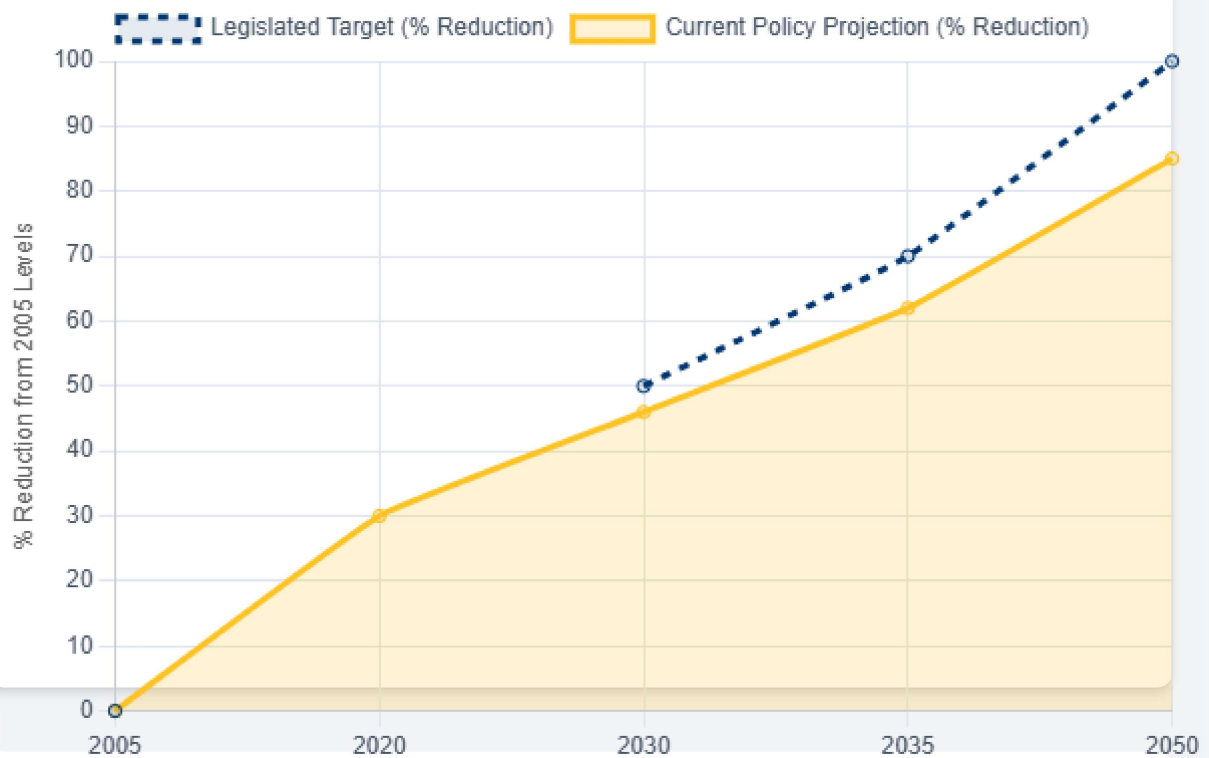
Reduction by
2035

ZERO

Net
Emissions by
2050

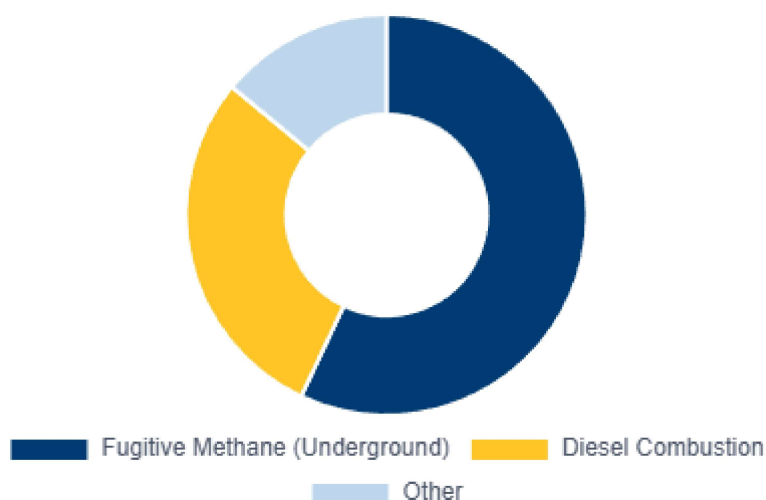
Target vs. Reality: The Emissions Gap

Despite legislated goals, current projections show NSW is not on track to meet its targets. This chart illustrates the gap between the state's commitments and the trajectory under current policies, highlighting the urgent need for accelerated action.



Composition of Coal Sector Emissions

Direct emissions from coal extraction are a major contributor to NSW's carbon footprint. Fugitive methane from underground mines and diesel combustion are the two largest sources, representing significant targets for abatement technologies.

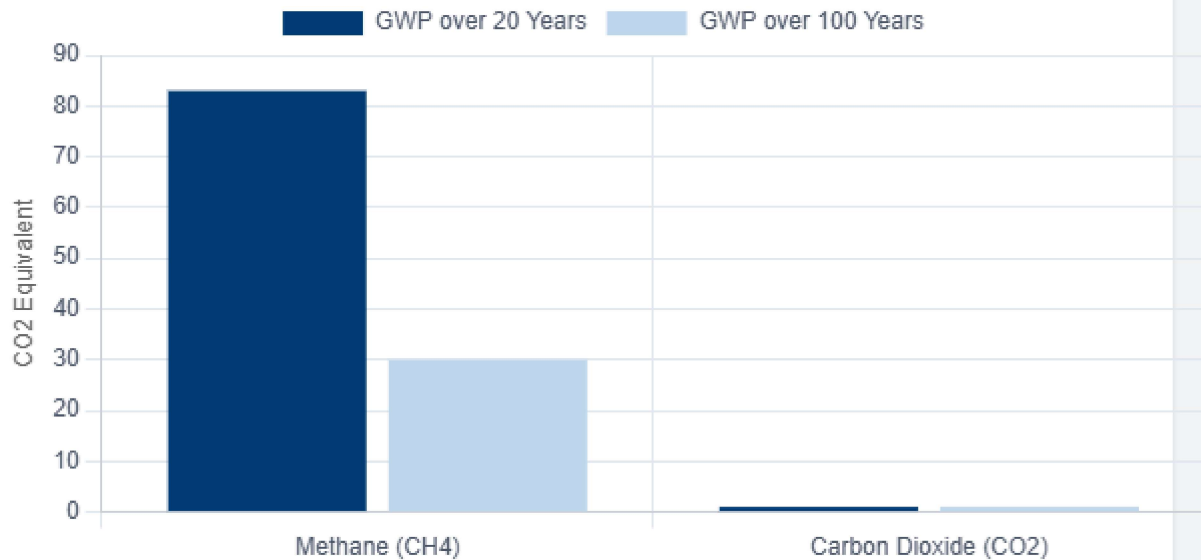


The Methane Challenge: A Potent Short-Term Threat

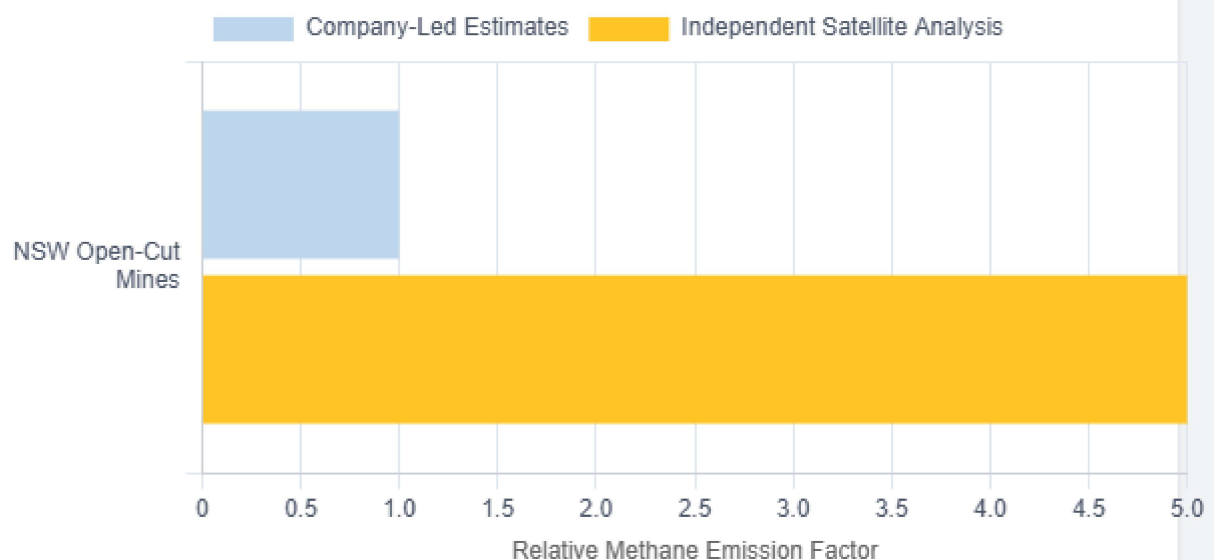
Methane is a powerful greenhouse gas. While it has a shorter atmospheric lifetime than CO₂, its warming potential is far greater,

especially over a 20-year period. This makes methane reduction a critical lever for achieving near-term climate goals. However, independent analysis suggests official methane reporting from coal mines is significantly underestimated.

Global Warming Potential (GWP)



Reported vs. Measured Methane



The Economic Equation: Costs of Inaction vs. Benefits of Transition

Delaying climate action carries severe economic penalties for NSW, from direct losses in GSP to widespread job insecurity. Conversely, a proactive transition to a low-carbon economy unlocks substantial opportunities for

growth, investment, and employment, demonstrating a clear financial imperative for change.

Risks of Inaction

▼ \$5+ Billion

Potential loss in Gross State Product from carbon tariffs.

▼ 20,000

Jobs at risk in fossil fuel-dependent industries.

▼ 50%

Projected decline in agricultural output in the Murray-Darling Basin by 2050.

Opportunities in Action

▲ \$680 Billion

Potential addition to Australian economic growth by 2070.

▲ 250,000

New jobs created nationally in the low-carbon economy.

▲ 90%

NSW's electricity grid powered by renewables by 2035.

Pathways to Abatement: A Technology-Led Approach

Proven technologies exist to significantly reduce emissions from the fossil fuel sector, particularly Ventilation Air Methane (VAM) from coal mines. The key challenge lies in overcoming implementation barriers through strong regulatory frameworks and targeted investment.

TECHNOLOGY

VAMCAT

FUNCTION

Electricity Generation

ADVANTAGE

Converts hazardous methane into usable power.

TECHNOLOGY

VAMMIT

FUNCTION

Methane Destruction

ADVANTAGE

High efficiency (>96%) methane oxidation.

TECHNOLOGY

Low-Carbon Diesel Alternatives

FUNCTION

Transport Decarbonization

ADVANTAGE

Reduces emissions from mining machinery.

This infographic is based on data and analysis related to the NSW Inquiry into emissions from the fossil fuel sector.