

**Submission
No 1**

**INQUIRY INTO THE IMPLEMENTATION OF THE
RECOMMENDATIONS CONTAINED IN THE NSW CHIEF
SCIENTIST'S INDEPENDENT REVIEW OF COAL SEAM
GAS ACTIVITIES IN NEW SOUTH WALES**

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Thank you for the opportunity to make a submission to the Inquiry into the implementation of the recommendations contained in the NSW Chief Scientist's Independent Review of Coal Seam Gas Activities in New South Wales.

The TERMS OF REFERENCE are:

1. That Portfolio Committee No.4 – Industry inquire into and report on the implementation of the recommendations contained in the NSW Chief Scientist's Independent Review of Coal Seam Gas Activities in New South Wales, and in particular:
 - (a) the status of the implementation of the recommendations,
 - (b) the effectiveness of the implementation of the recommendations and whether or not there are gaps in implementation,
 - (c) whether any other inquiry findings or other major reports relating to unconventional gas in Australia or the east coast gas market published since the release of the Chief Scientists are relevant to the suitability or effectiveness of the Chief Scientists recommendations, and
 - (d) any other related matters.
2. That the committee report by Friday 20 December 2019.

In 2013 The Chief Scientist of NSW was charged with undertaking an independent review into CSG activities in NSW. The terms of reference for that review included specifically to:

“Identify and assess any gaps in the identification and management of risk arising from coal seam gas exploration, assessment and production, particularly as they relate to human health, the environment and water catchments;”

The outcome of the NSW Chief Scientist’s Independent Review of Coal Seam Gas Activities in New South Wales was the following 16 recommendations.

Intent, communication, transparency and fairness

Recommendation 1

That Government make clear its intent to establish a world-class regime for extraction of CSG. This could be articulated in a clear public statement that covers:

- *the rationale/need for CSG extraction*
- *a clear signal to industry that high performance is mandatory, compliance will be rigorously enforced and transgressions punished*
- *a fair system for managing land access and compensation*
- *a mechanism for developing a clear, easy-to-navigate legislative and regulatory framework that evolves over time to incorporate new technology developments*
- *mechanisms for working closely and continuously with the community, industry, and research organisations on this issue.*

Recommendation 2

That Government ensure clear and open communication on CSG matters is maintained at all times. This includes:

- *simplicity and clarity in legislative and regulatory requirements*
- *ensuring openness about CSG processes in line with an open access approach; publishing all relevant approval requirements, decisions and responses, and*

compliance and enforcement outcomes on appropriate government websites and making CSG data from companies, Government and research organisations available through a centralised Government data repository

- *measurable outcomes to track performance against commitments to reform.*

Recommendation 3

That Government investigate as a priority a range of practical measures for implementation (or extension of current measures) to allow affected communities to have strengthened protections and benefits including fair and appropriate:

- *land access arrangements, including land valuation and compensation for landholders*
- *compensation for other local residents impacted (above threshold levels) by extraction activities*
- *funding (derived from the fees and levies paid by CSG companies) for local councils to enable them to fund, in a transparent manner, infrastructure and repairs required as a consequence of the CSG industry.*

Recommendation 4

That the full cost to Government of the regulation and support of the CSG industry be covered by the fees, levies, royalties and taxes paid by industry, and an annual statement be made by Government on this matter as part of the Budget process.

Legislative and regulatory reform and appropriate financial arrangements

Recommendation 5

That Government use its planning powers and capability to designate those areas of the State in which CSG activity is permitted to occur, drawing on appropriate external expertise as necessary.

Recommendation 6

That Government move to a single Act for all onshore subsurface resources (excluding water) in the State, constructed to allow for updating as technology advances. This will require a review of all major Acts applying to the resources sector.

Recommendation 7

That Government separate the process for allocation of rights to exploit subsurface resources (excluding water) from the regulation of the activities required to give effect to that exploitation (i.e. exploration and production activities); and that it establish a single independent regulator. The regulator will require high levels of scientific and engineering expertise, including geological and geotechnical ability, environmental and water knowledge and information, and ICT capability including data, monitoring and modelling expertise; and will be required to consult – and publish details of its consultations – with other arms of Government and external agencies, as necessary. The regulator will also require appropriate compliance monitoring and enforcement capability.

Recommendation 8

That Government move towards a target and outcome-focused regulatory system, with three key elements:

- *regularly reviewed environmental impact and safety targets optimised to encourage uptake of new technologies and innovation*
- *appropriate and proportionate penalties for non-compliance*
- *automatic monitoring processes that can provide data (sent to and held in the openly accessible Whole-of-Environment Data Repository) which will help detect cumulative impacts at project, regional and sedimentary basin scales which can be used to inform the targets and the planning process.*

Recommendation 9

That Government consider a robust and comprehensive policy of appropriate insurance and environmental risk coverage of the CSG industry to ensure financial protection short and long term. Government should examine the potential adoption of a three-layered policy of security deposits, enhanced insurance coverage, and an environmental rehabilitation fund.

Managing risk by harnessing data and expertise

Recommendation 10

That Government commission the design and establishment of a Whole-of-Environment Data Repository for all State environment data including all data collected according to legislative and regulatory requirements associated with water management, gas extraction, mining, manufacturing, and chemical processing activities. This repository, as a minimum, would have the characteristics that it:

- is accessible by all under open data provisions*
 - has excellent curatorial and search systems*
 - houses long-term data sets collected as part of compliance activities*
 - can accept citizen data input*
 - can be searched in real time*
 - is spatially enabled*
 - is able to hold data in many diverse formats including text, graphics, sound, photographs, video, satellite, mapping, electronic monitoring data, etc., with appropriate metadata*
 - is the repository of all research results pertaining to environmental matters in NSW along with full details of the related experimental design and any resulting scientific publications and comments*
 - is the repository of historical resources data with appropriate metadata*
- Various legislative amendments or other incentives will be needed to direct all environment data to the Repository.*

Recommendation 11

That Government develop a centralised Risk Management and Prediction Tool for extractive industries in NSW. This would include a risk register, a database of event histories, and an archive of Trigger Action Response Plans. The tool would be updated annually based on Government and company reporting and would include information on risk management and control approaches and draw on data from the Whole-of-Environment Data Repository for the State. The risk tool would be reviewed and commented on by relevant expert and regulatory bodies. The risk tool would be used to assist with:

- assessing new proposals*
- assessing compliance*
- improving prediction capability for consequences of incidents in risk assessments*
- improving prediction capability of risk likelihoods*
- informing project design amendments to decrease risk levels (such as undertaken in the Dam Safety Committee)*
- informing the calculation of cumulative impacts*
- flagging issues or risks that require a higher level of regulatory protection such as inclusion in legislation.*

Recommendation 12

That Government establish a standing expert advisory body on CSG (possibly extended to all the extractive industries). This body should comprise experts from relevant disciplines, particularly ICT and the earth and environmental sciences and engineering, but drawing

as needed on expertise from the biological sciences, medicine and the social sciences. The prime functions of this expert body would be to advise Government:

- on the overall impact of CSG in NSW through a published Annual Statement which would draw on a detailed analysis of the data held in the Whole-of-Environment Data Repository to assess impacts, particularly cumulative impacts, at project, regional and sedimentary basin scales*
- on processes for characterising and modelling the sedimentary basins of NSW*
- on updating and refining the Risk Management and Prediction Tool*
- on the implications of CSG impacts in NSW for planning where CSG activity is permitted to occur in the State*
- on new science and technology developments relevant to managing CSG and when and whether these developments are sufficiently mature to be incorporated into its legislative and regulatory system*
- on specific research that needs to be commissioned regarding CSG matters*
- on how best to work with research and public sector bodies across Australia and internationally and with the private sector on joint research and harmonised approaches to data collection, modelling and scale issues such as subsidence*
- on whether or not other unconventional gas extraction (shale gas, tight gas) industries should be allowed to proceed in NSW and, if so, under what conditions.*

Recommendation 13

That Government establish a formal mechanism consisting of five parallel but interacting steps. The five steps are given below.

- Companies or organisations seeking to mine, extract CSG or irrigate as part of their initial and ongoing approvals processes should, in concert with the regulator, identify impacts to water resources, their pathways, their consequence and their likelihood, as well as the baseline conditions and their risk trigger thresholds before activities start. These analyses and systems should be incorporated in project management plans to meet regulator-agreed targets. Appropriate monitoring and characterization systems would be developed as part of these project management plans and then installed. The monitors would measure baseline conditions and detect changes to these, as well as providing data on impacts and triggered risk thresholds.*
- Data from the monitors should be deposited (either automatically or in as close to real time as possible) in the State Whole-of-Environment Data Repository by all the extractive industries. Increasingly automated tools to interrogate data in the Repository should be developed, and these used to search data for discontinuities and compliance alerts.*
- As a separate process, the expert advisory body would examine on a frequent basis all data relevant to a region or a sedimentary basin. This data would come from a range of sources (the companies' monitoring data along with triangulation/crossvalidation data such as that from satellites, reports from local councils, seismic data, subsidence maps, information from cores, etc.). The expert body would use this data review to check for any factors signalling problems in that region and, if any are found, recommend to Government the appropriate action to be taken with regard to the relevant parties.*
- In a parallel process, the Government should commission, construct and maintain a variety of models of each region and in particular one that seeks to address cumulative impacts. These models should feed into the land use planning process and the activity approvals processes, and should assist in target setting for new projects.*
- Government, working with other appropriate Australian governments, should commission formal scientific characterisation of sedimentary basins starting with the East Coast basins, and concentrating initially on integration of groundwater with the geological, geophysical and hydrological context. Viewing these integrated systems in models and in interpretation could be described as a 'Glass Earth' approach to understanding the dynamics of activities and impacts in the basins.*

Training and certification

Recommendation 14

That Government ensure that all CSG industry personnel, including subcontractors working in operational roles, be subject to ongoing mandatory training and certification requirements. Similarly, public sector staff working in compliance, inspections and audits should be given suitable training and, where appropriate, accreditation.

Legacy and consistency matters

Recommendation 15

That Government develop a plan to manage legacy matters associated with CSG. This would need to cover abandoned wells, past incomplete compliance checking, and the collection of data that was not yet supplied as required under licences and regulations. There will also need to be a formal mechanism to transition existing projects to any new regulatory system.

Recommendation 16

That Government consider whether there needs to be alignment of legislation and regulation governing extraction of methane as part of coal mining and the application of buffer zones for gas production other than CSG with the relevant legislation and regulation provisions governing CSG production.

OUTCOMES

Five years after the Chief Scientists report it is clear that the Chief Scientist's recommendations have substantially not been implemented.

As is evidenced by answers to supplementary questions¹ on Hansard to the Deputy Premier with answers received on 9th October 2019, the regulatory framework proposed by the Chief Scientist in recommendation 4 is not in place, no report has yet been submitted to the government and nowhere in the Budget Papers is the 'annual statement' provided for in recommendation 4.

The NSW government has not implemented Recommendation 9 for a robust and comprehensive policy of appropriate insurance for the CSG industry. The deputy premier was unable to provide answers on notice to: where documentation for recommendation 9 could be read, terms of relevant insurance policy or policies, whether insurance is underwritten by the private market or by government, how many policies of insurance are now in place, what premiums are charged, what was the scheme of security deposits, or any information on the terms of the rehabilitation fund or even when recommendation 9 will be delivered.

Five years after the Chief Scientists report the deputy premier was unable to provide answers on notice to the status of the Whole-of-Environment Data Repository (recommendation 10). Since recommendations 2,8,10, 11,12, and 13 are all dependent on the Whole-of-Environment Data Repository this is a critical omission.

The deputy premier was also unable to provide answers on notice to the status of Recommendation 11, the centralised Risk Management and Prediction Tool

for all extractive industries in NSW, with the risk register, database of event histories and the archive of Trigger Action Response Plans.

The deputy premier confirmed that Recommendation 12 has not been enacted.

The Government has not used its planning powers and capability to designate those areas of the State in which CSG activity is permitted to occur (recommendation 5)

DEFICIENCIES AND UPDATED INFORMATION

It is important to remember that the TOR for the NSW Chief Scientist's Report did not leave open an option to recommend that CSG should not proceed, merely to identify gaps in the management of risk.

As significant and important as the 16 recommendations of the NSW Chief Scientist's Independent Review of Coal Seam Gas Activities in New South Wales report in 2014 are, within the terms of reference, two issues are patently clear.

- 1) The recommendations have not been enacted
- 2) There are critical deficiencies in the recommendations in the initial report, even within the limited terms of reference. Specifically there are no recommendations relating to health, and there are no specific recommendations relating to the impact of the gas industry on climate disruption.

HEALTH

With regards to health these omissions occurred despite the fact that the Chief Scientist's report noted that: "There is a significant lack of peer-reviewed publications on health and CSG." The only Australian-specific Human Health Risk Assessment (QH, Queensland Government, 2013)² quoted in the Chief Scientist's report has subsequently been comprehensively discredited in the peer review process. Independent analysis of the Queensland Government 2013 health study by Claudio, de Rijke & Page, 2018³ indicates that far from being a comprehensive health study, **the Queensland Government report failed to meet Health Impact Assessment international best practice because 7 of 9 key steps were omitted.**

"The Darling Downs study here reviewed is characterized by poor methodology and should alert health professionals to the paucity of CSG health-related environmental and health data. The study illustrates the lack of regulatory initiative to enforce best-practice collection of baseline data."

Dr Jeanette Young head of Queensland Health, has acknowledged in private correspondence (19th May 2018) that the 2013 Queensland Health report effectively is Step 1 of the 9 steps of the International framework utilized by the International Council on Mining and Metals.

In the context of the extensive development of the CSG industry in rural Queensland and the ongoing reports of health impacts it is disturbing to note that **in 2018 CSIRO reported that an in-depth health impact study had yet to be conducted in an Australian CSG region.**⁴ The few peer reviewed health studies published in Australia raise serious concerns. Werner, et al. (2016) found

that hospital admission rates for certain conditions (neoplasms and blood/immune diseases increased more quickly in the CSG area than in other study areas.⁵ A further study by Werner, et al. (2018) demonstrated a 7-11% increase in hospitalization rate for respiratory disease in very young children (0-4years) and in the 10-14 year old age group.⁶ They also found a significant increase in blood/ immune diseases in the 5-9 year age group compared to children in areas without CSG activity. My 2018 peer reviewed paper demonstrates that the significantly increased rate of hospitalisation of residents in the Darling Downs area for acute circulatory and respiratory conditions rose coincident with the acknowledged escalation of air toxins emitted by the CSG industry and known to cause such symptoms.⁷ A 2014 CSIRO survey of 390 gas field residents documented that 48.5% felt their community was 'only just coping', 'not coping', or resisting the industry.⁸ Psychologist Dr Methuen Morgan from the University of New England noted in his 2016 paper that "*Farmers in CSG-Stressed and Globally stressed profiles exhibited clinically significant levels of psychological morbidity*".⁹

In the 5 years since the Chief Scientist's report was released an extensive body of international research data has been published regarding the health impacts of the unconventional gas industry. The weight of findings in the scientific literature indicate hazards and elevated risk to human health associated with the industry, and several major public health studies show a clear detrimental impact on the health of communities and populations at multiple levels. ^{10, 11, 12,13} Public health problems associated with drilling and fracking include poor birth outcomes, reproductive and respiratory impacts, cancer risks, and occupational health and safety problems. A significant increase in low birth weight has been reported in several studies.^{14, 15, 16} Increased risk of extreme prematurity and high risk pregnancy,^{17, 18} and congenital heart defects and neurological malformations has been documented,¹⁹ as has the association between the industry and increased incidence of leukaemia in young people.^{20, 21} Several studies have demonstrated the chest, heart, neurological, skin and ear nose and throat impacts on exposed communities. ^{22, 23 , 24} A clear association between hospitalisation rate for these health impacts and the intensity of the industry has also been demonstrated.²⁵

At this point in time, in the absence of in-depth Australian studies, the significance of these international studies into the health impacts of unconventional gas cannot and must not be minimized.

CLIMATE CHANGE

Climate disruption is now recognized as an existential threat. It is the single biggest threat to global health this century and the impacts of climate disruption are now clearly evident in Australia as well as world-wide²⁶. At a time when reducing greenhouse emissions is absolutely critical, Australia's greenhouse gas emissions have been rising annually over the past 5 years, and this is directly as a consequence of emissions from the unconventional gas industry. Australian politicians have been in a state of denial regarding Australia's role in both the problem and the solution. They claim that Australia is responsible for 1.5% of

global emissions when in fact, due to the mining of fossil fuels (gas, coal, and oil,) if Australia continues on its present trajectory it will be responsible for 13% of global CO₂ emissions by 2030.²⁷ Unfortunately the Chief Scientist report into the Coal Seam Gas industry did not contain any specific recommendations on greenhouse gas emissions. This is a critical omission and at this point in time should lead the Committee to re-evaluate the place fossil fuels, including gas, has in the future energy make-up.

WATER AND WASTE

In this changing climate the fundamental importance of water to our lives and well-being cannot be overemphasized. **There is no resource more important than water.** Australia is already in severe water crisis. The gas industry, whether it be CSG, Shale, tight sands uses, wastes and contaminates massive volumes of this precious resource. Santos's planned Narrabri project in Pilliga forest involves drilling through and extracting water from the critical recharge area of the Great Artesian Basin with potentially catastrophic consequences. Despite repeated and specific questions by the regulator, Santos has failed to provide any substantive answers as to how it would safely dispose of the massive volumes of contaminated waste/salt/ radioactive waste it would generate²⁸.

ECONOMICS

With the commencement to the LNG export projects in 2015, gas prices in the domestic Eastern Gas Region escalated directly as a result of diversion of gas to the export GLNG and LNG gas market. This has had entirely predictable results in escalation of electricity prices for both domestic consumers and manufacturing, and reduction in competitiveness of Australian manufacturers. The estimated production costs of the Narrabri Gas Project confirm that it is high-cost gas with no potential cost benefit for domestic consumers.²⁹

CONCLUSION

In her 2014 report the Chief Scientist stated:

"There are no guarantees."

"..it is inevitable that the CSG industry will have some unintended consequences, including as the result of accidents, human error, and natural disasters.."

I believe that now the science clearly shows that the unconventional gas industries, if allowed to proceed, **with have dire and entirely predictable consequences.** The risk to water, the risk to climate and the ultimate risks to health are too high.

In the past there may have been some people who perhaps genuinely thought that this extremely high-risk industry could be regulated into safety. Unfortunately it cannot be. After five years the failure to implement the recommendations of the Chief Scientists report raises serious questions about the will of Government and the regulators to even try to regulate it.

It is time for a complete and permanent ban.

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<https://www.parliament.nsw.gov.au/lcdocs/other/12674/Answers%20to%20supplementary%20questions%20on%20regional%20New%20South%20Wales%20Industry%20and%20Trade%20-%20Barilaro%20-%20received%209%20October%202019.pdf>

² Queensland Government 2013 Coal seam gas in the Tara region, summary risk assessment of health complaints and environmental monitoring data report <https://www.health.qld.gov.au/research-reports/reports/environmental-health>

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⁵ Werner AK, Watt K, Cameron CM, Vink S, Page A, Jagals P. All-age hospitalization rates in coal seam gas areas in Queensland, Australia, 1995–2011. *BMC Public Health* 2016; 16: 125. <https://doi.org/10.1186/s12889-016-2787-5>

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¹⁰ Concerned Health Professionals of New York & Physicians for Social Responsibility. (2019, June). *Compendium of scientific, medical, and media findings demonstrating risks and harms of fracking (unconventional gas and oil extraction)* (6th ed.). <https://concernedhealthny.org/wp-content/uploads/2019/06/Fracking-Science->

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- ¹² Canadian Association of Physicians for the Environment. Position Statement. December 2108. <https://cape.ca/campaigns/healthy-sustainable-energy/oil-gas-climate-health/oil-gas-extraction/>
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²⁸ Hannam,P., 2018, Sydney Morning Herald 'Not the details requested': EPA, RFS, others rebuke Santos over CSG <https://www.smh.com.au/environment/sustainability/not-the-details-requested-epa-rfs-others-rebuke-santos-over-csg-20180916-p50435.html>

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²⁹

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