Australian Government Submission to the Select Committee on Unconventional Gas Mining

March 2016

Acronyms and Abbreviations

APPEA	Australian Petroleum Production and Exploration Association
ATSE	Academy of Technology Sciences and Engineering
CMA	Cumulative Management Area
COAG	Council of Australian Governments
CSG	Coal Seam Gas
CSIRO	Commonwealth Scientific and Industrial Research Organisation
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
FID	Final Investment Decision
GISERA	Gas Industry Social and Environmental Research Alliance
IEA	International Energy Agency
IESC	Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development
LARWG	Land Access for Resources Working Group
LNG	Liquefied Natural Gas
METS	Mining Equipment, Technology and Services
MLUF	Multiple Land Use Framework
NERA	National Energy Resources Australia
NICNAS	National Industrial Chemicals Notification and Assessment Scheme
NGER	National Greenhouse and Energy Reporting
NPA	National Partnership Agreement on Coal Seam Gas and Large Coal Mining Development
PJ	Petajoules
PRRT	Petroleum Resource Rent Tax
SCO	Senior Committee of Officials
UPR	Upstream Petroleum Resources Working Group
UWIR	Underground Water Impact Report

Introduction

Gas – both conventional and unconventional[1] – plays an important role in supplying energy to Australia and the world. In 2013-14 natural gas consumption in Australia was 1,402 petajoules (PJ), equal to 24 per cent of total energy consumption.[2] Gas is used in millions of Australian households for heating and cooking and is critical to many Australian industries such as those that manufacture and supply chemicals, plastics, glass, pharmaceuticals, fertilisers, paints, pesticides and cosmetics.[3,4] More than half of Australia's national gas production is exported, with Australia currently the world's third largest exporter of liquefied natural gas (LNG).[5]

Investment in the development of gas production infrastructure is significant and requires a long term investment horizon and commitment. For example, the $54 billion Gorgon LNG project in Western Australia took seven years to progress from final investment decision (FID) in 2009 to its commissioning in March 2016. The LNG projects in Queensland took nearly five years from the time of FID to commissioning in 2015-16. These billion dollar investments can only take place when there is a stable policy and regulatory environment.

Along with the large capital investment, coal seam gas (CSG) development in Queensland has had a positive economic impact, with increases in income, consumption and government revenue.[6] The industry has resulted in increases in both direct and indirect employment, particularly in the construction and professional services sectors.[7]

Securing long-term gas supply through safe and responsible development is integral to a prosperous Australian economy. Future energy security and economic growth will be driven through greater diversity of supply, with unconventional gas becoming increasingly important to Australia's energy mix.

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1 The International Energy Agency refers to unconventional gas as: shale gas: natural gas contained within a commonly occurring rock classified as shale; coal seam gas (CSG): natural gas contained in coalbeds; tight gas: natural gas found in low permeability formations; http://www.worldenergyoutlook.org/media/weowebsite/2012/goldenrules/weo2012_goldenrulesreport.pdf

2 Commonwealth of Australia (2016). *Energy in Australia 2015*; http://www.industry.gov.au/Office-of-the-Chief-Economist/Publications/Documents/energy-in-aust/Energy-in-Australia-2015.pdf

3 Australian Petroleum Production and Exploration Association (2015). *Australia's Bright Gas Future*; www.appea.com.au/wp-content/uploads/2015/12/Australias-Bright-Gas-Future.pdf

4 In some cases, gas cannot be replaced as a fuel as "*electricity simply cannot produce the temperatures or consistency of heat needed in the manufacture of products such as bricks, glass and paper.*" Malcolm Roberts, APPEA Chief Executive, www.appea.com.au/media_release/a-bright-gas-future-for-customers-and-the-environment/

5 Commonwealth of Australia (2016). *Energy in Australia 2015*; http://www.industry.gov.au/Office-of-the-Chief-Economist/Publications/Documents/energy-in-aust/Energy-in-Australia-2015.pdf

6 Commonwealth of Australia (2015). *Review of the socioeconomic impacts of coal seam gas in Queensland*; http://www.industry.gov.au/Office-of-the-Chief-Economist/Publications/Documents/coal-seam-gas/Socioeconomic-impacts-of-coal-seam-gas-in-Queensland.pdf

7 Fleming, D.A. and Measham, T.G. (2015). Local economic impacts of an unconventional energy boom: the coal seam gas industry in Australia. *The Australian Journal of Agricultural and Resource Economics* 59, 78-94.

The Australian, state and territory governments have a shared responsibility to ensure the safe and responsible development of unconventional gas resources and to maximise benefits for the Australian community. State and territory governments have principal responsibility for unconventional gas development, but the Australian Government plays an important leadership role in providing appropriate policy settings and regulation. This includes developing national level energy policy (for example, *Energy White Papers*[8]), protecting matters of national environmental significance through the *Environment Protection and Biodiversity Conservation Act 1999* (EBPC Act), and working with state and territory governments through established policy, regulatory and scientific frameworks, such as the *National Harmonised Regulatory Framework for Natural Gas from Coal Seams*[9].

This Australian Government submission describes how these existing jurisdictional, statutory and policy frameworks can effectively manage the potential environmental risks and social impacts associated with Australia's unconventional gas industry.

[8] Commonwealth of Australia (2015). *2015 Energy White Paper*; http://ewp.industry.gov.au/sites/prod.ewp/files/EnergyWhitePaper.pdf

[9] Standing Council on Energy and Resources (2013). *National Harmonised Regulatory Framework for Natural Gas from Coal Seams*; http://www.scer.gov.au/sites/prod.energycouncil/files/publications/documents/National-Harmonised-Regulatory-Framework-for-Natural-Gas-from-Coal-Seams_1.pdf

Responses to the Terms of Reference

ToR 1a: A national approach to the conduct of unconventional gas mining in Australia

The Australian Government agrees that a coordinated and balanced national approach is necessary for the responsible development of the unconventional gas industry. This principle was embedded by the Australian Government in its *Domestic Gas Strategy*[10], drawing on experience in working with the states and territories on resource development and environmental protection. Environmental protection at a national level is given effect through the *Environment Protection and Biodiversity Conservation Act 1999*, and is strengthened by the *National Partnership Agreement on Coal Seam Gas and Large Coal Mining Development*[11], and the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development[12] (IESC). The Australian Government continues to work through the COAG Energy Council to identify strategies for deeper collaboration with the states and territories through implementation of the *Gas Supply Strategy*.[13] Details of how these initiatives support this national approach are provided below.

Domestic Gas Strategy

The *Domestic Gas Strategy* outlines the Australian Government's role, science capabilities, and expectations of state and territory governments and industry for the responsible development of Australia's unconventional gas industry. The strategy also identifies the following actions to improve the availability of independent scientific information so that communities have more confidence in the evidence base used by decision makers:

- Conducting research through its environmental and scientific agencies, including the Department of the Environment, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), and Geoscience Australia;
- Supporting the expansion of the Gas Industry Social and Environmental Research Alliance (GISERA) model into New South Wales;
- Supporting the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC); and
- Supporting the Industry Growth Centres Initiative.[14]

The *Domestic Gas Strategy* also reflects the Australian Government's commitment to balancing competing land uses, as identified by the following principles in the *Agricultural Competitiveness White Paper*[15]:

[10] Commonwealth of Australia (2015). *Domestic Gas Strategy*; http://www.industry.gov.au/Energy/EnergyMarkets/Documents/Domestic-Gas-Strategy.pdf
[11] http://www.environment.gov.au/water/coal-and-coal-seam-gas/office-of-water-science/npa
[12] www.iesc.environment.gov.au/home
[13] COAG Energy Council (2015). *Gas Supply Strategy*; https://scer.govspace.gov.au/files/2015/12/Gas-Supply-Strategy.pdf
[14] More information on the Industry Growth Centres Initiative is available at: http://www.business.gov.au/IndustryGrowthCentres

- Access to agricultural land should only be done with the farmer's agreement, and farmers should be fairly compensated;
- There must be no long-term damage to water resources used for agriculture and local communities; and
- Prime agricultural land and quality water resources must not be compromised for future generations.

Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act is the principal piece of legislation that allows the Australian Government to join with the states and territories to provide a national framework for the protection of our biodiversity.

The EPBC Act focuses on the protection of matters of national environmental significance, while state and territory legislation focuses on matters of state and local significance. In 2013, the EPBC Act was amended to include water resources as a matter of national environmental significance when affected by CSG and large coal mining development (the 'water trigger').

The water trigger requires CSG development that is likely to have a significant impact on a water resource to be comprehensively assessed at a national level.[16] It also allows the Minister for the Environment to set appropriate conditions, as part of the project approval, to ensure that any impacts from these projects on a water resource are acceptable. The Minister for the Environment is required to seek the advice of the IESC on all water trigger projects.

Under the EPBC Act, the Minister for the Environment may accredit the assessment processes of a state or territory, thereby removing unnecessary duplication and red tape. Under an assessment bilateral agreement, the relevant state or territory government regulator is responsible for undertaking the statutory assessment process for proposed developments on behalf of the Australian Government regulator. The Australian and relevant state or territory government regulators then make separate decisions on the approval of the development.

Assessing CSG projects in this way has contributed to a nationally comprehensive approach to assessing and conditioning projects that are likely to have a significant impact on a water resource. As of 15 January 2016, seven CSG developments have been determined to be a 'controlled action' under the water trigger provisions of the EPBC Act. Of these, three developments have been approved, three are undergoing assessment (active) and one has been withdrawn. The IESC has provided advice on four of these developments to date, and the remaining projects will receive IESC advice prior to a decision.

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[15] Commonwealth of Australia (2015). *Agricultural Competitiveness White Paper*; http://agwhitepaper.agriculture.gov.au/SiteCollectionDocuments/ag-competitiveness-white-paper.pdf

[16] http://www.environment.gov.au/water/coal-and-coal-seam-gas

Since the water trigger legislation was introduced, the Minister for the Environment has been able to require conditions for approval (on both coal seam gas and large coal mining developments) to ensure that any significant impacts on a water resource are acceptable. Broadly, conditions have included requirements for:

- More extensive baseline monitoring;
- Further research characterising relevant groundwater resources;
- Best practice monitoring and management for both water quality and quantity;
- The review and updating of numerical groundwater models;
- Developing and implementing management actions to manage risk in stages so that changes or modifications can take new information into account;
- Identification of thresholds and limits relevant to the project's impacts on groundwater and surface water, including requirements to stop activity where limits have been reached; and
- Management and monitoring of the final void (for open-cut coal mines).

Section 25 of the EPBC Amendment Act that established the water trigger requires an independent review of the operation of this legislation. The independent review will also serve as the post-implementation review. This is required by the Australian Government Office of Best Practice Regulation when legislation is introduced without an accompanying Regulation Impact Statement, as was the case for the water trigger.

The review will:

- Examine the appropriateness of the regulation including whether it is necessary and well targeted;
- Examine the effectiveness of the regulation in protecting water resources from the impacts of CSG and large coal mining projects, including the role and scope of work ascribed to the IESC;
- Identify any opportunities to improve the effectiveness of the regulation;
- Examine the efficiency of the regulation in protecting water resources from the impacts of CSG and large coal mining projects;
- Identify any opportunities to reduce or simplify the regulation whilst maintaining its effectiveness; and
- Identify any recommended appropriate future review points of the regulation.

The review is expected to be completed by May 2016.

Details about proposed legislative amendments to the EPBC Act related to the water trigger and the IESC, and implementation of bilateral agreements under the EBPC Act are contained in Appendix A. The amendments include a series of provisions to strengthen the IESC, including enabling any state or territory to directly seek advice from the IESC regardless of

whether it is a party to the NPA. This would ensure that all states and territories have access to the best available science.

National Partnership Agreement on Coal Seam Gas and Large Coal Mining Development

The *National Partnership Agreement on Coal Seam Gas and Large Coal Mining Development* (NPA) was agreed in 2012 between the Australian Government and the Queensland, New South Wales, Victorian and South Australian governments (the Parties).[17] The overarching objective of the NPA was to strengthen the regulation of coal seam gas and large coal mining development by ensuring that future decisions are informed by substantially improved science and independent expert advice.

The NPA required the Australian Government to establish the IESC, and committed the Australian Government and signatory state government regulators to seek and consider the IESC's advice on the potential impacts on water resources before taking regulatory decisions on proposed CSG and large coal mining developments.

An independent review of the NPA[18] found that it met its objective by enhancing the extent to which decisions have been informed by improved science and independent expert advice. This review also found that more could be done by the Parties to build on this. For example, by building further awareness of the existing and emerging scientific evidence base, refining and improving arrangements around the IESC, and working together to increase efforts to enhance industry, stakeholder and community knowledge of the application of independent science to development decisions. The Parties to the NPA are currently drafting a joint response to the review recommendations.

While the NPA was in effect until 30 June 2014, the resulting legislative and regulatory arrangements put in place by the Parties under the NPA ensure that the NPA objective continues to be met.

Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development

The IESC provides scientific advice to decision makers on the impact that CSG and large coal mining development may have on Australia's water resources.

The IESC was established as a statutory committee in 2012 by the Australian Government under the EPBC Act in response to community concerns. An Interim IESC operated between January and November 2012. IESC members [19] possess strong scientific qualifications and expertise in the fields of hydrogeology, hydrology, ecology, geology, ecotoxicology, natural resource management and environment protection.

[17] Council of Australian Governments (2012). *National Partnership Agreement on Coal Seam Gas and Large Coal Mining Development*; http://www.federalfinancialrelations.gov.au/content/npa/environment/csg_and_lcmd/NP.pdf

[18] Hunter, S. (2015). *Independent Review of the National Partnership Agreement on Coal Seam Gas and Large Coal Mining Development*; http://www.environment.gov.au/system/files/pages/354eb042-14dd-47fb-a24f-5dbd84834302/files/npa-review-final-report.pdf

[19] http://www.iesc.environment.gov.au/iesc

The IESC provides independent, expert scientific advice on CSG and large coal mining proposals as requested by the Australian Government and NPA signatory state government regulators. This enables regulators to have access to the best available science regarding potential water related impacts associated with those developments. All IESC advice is published on its website.[20]

The IESC also provides advice to the Australian Government on bioregional assessments and research priorities and projects[21] to improve the knowledge base regarding the potential water related impacts of CSG and large coal mining.

COAG Energy Council

The COAG Energy Council has a very active gas sector reform programme. In December 2015, the Energy Council released the *Gas Supply Strategy*[22], demonstrating that governments across Australia are working together to enable increased supply. The strategy identifies the following opportunities for collaboration across jurisdictions:

- Improving information on gas reserves and production potential;
- Improving public availability and accessibility of rigorous science and factual information;
- Consideration of leading practice regulatory frameworks that effectively manage the risks and address issues for all conventional and unconventional gas resources; and
- Supporting leading practices in industry to support responsible development.

The Energy Council is currently developing a detailed implementation plan for the strategy with clear actions, with accountabilities and timelines, to be considered in July 2016. The implementation plan actions cover:

- Formalising protocols to guide the sharing of information, expertise and learnings between jurisdictions and the broader community;
- Evaluating the opportunity to expand collaborative research models;
- Incorporating lessons learnt into the *National Harmonised Regulatory Framework for Natural Gas from Coal Seams* to maintain its currency and relevance; and
- Fostering closer links with international experts to import learnings from other countries.

ToR 1b: The health, social, business, agricultural, environmental, landholder and economic impacts of unconventional gas mining

[20] www.iesc.environment.gov.au/committee-advice/proposals
[21] www.environment.gov.au/water/coal-and-coal-seam-gas/science-research
[22] COAG Energy Council (2015). *Gas Supply Strategy*; https://scer.govspace.gov.au/workstreams/energy-market-reform/gas-market-development/coag-energy-council-gas-supply-strategy/

The Australian Government recognises that there are community concerns around the possible risks and impacts of unconventional gas development. A summary of the key findings from a large body of research is provided below in relation to the specific topics in ToR 1b. This research continues to inform policy development and regulation of unconventional gas development. A list of recent reviews on the topics of ToR 1b is also included in Appendix B.

Health

Health impacts of new industrial chemicals (i.e., chemicals that are not 'existing chemicals' listed on the Australian Inventory of Chemical Substances) proposed for use in unconventional gas activities are assessed by the National Industrial Chemicals Notification and Assessment Scheme (NICNAS) prior to their introduction. NICNAS assessments cover risks to worker health and safety, public health and the environment. Where an assessment undertaken by NICNAS identifies a risk that requires management, recommendations are made to the relevant risk management agency. Risk management is primarily a state or territory government responsibility, although the Australian Government may be involved in providing national coordination. NICNAS aids in the protection of the Australian people and the environment by assessing the risks of industrial chemicals and providing information to promote their safe use.

The Australian Government Department of the Environment in collaboration with NICNAS and the CSIRO is currently completing the National Assessment of Chemicals Associated with Coal Seam Gas Extraction. This Assessment is examining the surface and near surface water-related impacts of drilling and hydraulic fracturing chemicals used for coal seam gas extraction in Australia. It will inform Australian governments, the IESC, industry and the public about the potential risks of these chemicals to human health and the environment when used in coal seam gas extraction.

In 2013 the Queensland Department of Health completed a review of the health effects of coal seam gas developments across the state. This review concluded that "*a clear link cannot be drawn between the health complaints by some residents in the Tara region and impacts of the local CSG industry on air, water or soil within the community*."[23] In this review, noise and vibration complaints from CSG were found to be a source of nuisance; however, these levels did not exceed environmental limits.

Environmental

The Department of the Environment[24] is leading the Australian Government's efforts to improve our understanding of the water-related impacts of CSG and large coal mining development. This includes programmes of targeted bioregional assessments and research, and providing secretariat and technical support to the IESC.

Bioregional Assessment Programme

[23] Queensland Government (2013). *Coal seam gas in the Tara region: summary risk assessment of health complaints and environmental monitoring data;* https://www.health.qld.gov.au/publications/csg/documents/report.pdf

[24] www.environment.gov.au/water/coal-and-coal-seam-gas/office-of-water-science

Bioregional assessments are science-based studies that improve our understanding of impacts to water resources from CSG and large coal mining across 13 regions in New South Wales, Queensland, South Australia, and Victoria. They assess where potential cumulative impacts on water are likely to occur and, importantly, where impacts are not likely to occur. To assess cumulative impacts, the bioregional assessments compare existing water use in the region (the 'baseline') to the additional coal and CSG developments post-2012. The findings are generally at a regional level and will allow governments, industry and the community to focus on areas that are likely to be impacted by coal and CSG development, resulting in improved regulatory, water management and planning decisions.

The programme is based on an internationally peer-reviewed innovative methodology. Almost all assessment products, methods, maps, models and more than 1,400 datasets will be publicly available on an information platform. This will allow natural resource managers, community members, government, industry and other interested parties to easily access information, while making the process more transparent to the public.

Approximately $87.4 million has been committed by the Department of the Environment for bioregional assessments since commencement in 2012, through to expected completion of the assessments in 2017. To date, $69.8 million has been paid. Forty reports and two methodologies have been released so far, to ensure decision-makers have access to the best-available science.

The IESC draws upon available bioregional assessment products when providing its scientific advice to regulators on CSG or large coal mining proposals. Bioregional assessment products have been referenced in Commonwealth approval conditions, such as those for the Shenhua Watermark Coal Project and the Stratford Extension Project, to ensure that the best-available science on cumulative impacts is taken into account in the ongoing management of these developments.

Other Research

In addition to the bioregional assessments, the Department of the Environment has commissioned scientific research[25] in priority themes identified by the IESC to better understand the impacts of CSG and large coal mining development on water resources. The research aims to strengthen the science underpinning regulatory decisions, including by informing the advice the IESC provides to Australian government regulators on individual development proposals. The priorities are:

- Hydrology: addressing knowledge gaps in inter-aquifer connectivity, bore integrity, subsidence and groundwater modelling;
- Ecosystems and water: improving scientific understanding of the ecological impacts caused by changes to water quantity, quality, and flow; and informing the ability to monitor and mitigate the effects of coal seam gas and coal mining on aquatic ecosystems, key species and ecological communities;

[25] https://www.environment.gov.au/water/coal-and-coal-seam-gas/science-research

- Chemicals: water-related risks to environmental health; improving scientific understanding of chemicals used in drilling and hydraulic fracturing, their movement in surface and groundwater systems, and their toxicity; and informing decisions about the management of salts and heavy metals; and
- Cumulative impacts: a cross-cutting issue informed by ongoing work on the priority themes and through the bioregional assessments.

Water Resources

Water is a key component of the unconventional gas debate. On this issue, the NSW Chief Scientist and Engineer's *Independent Review of Coal Seam Gas Activities in NSW* report indicated that drinking water would not be contaminated if the right technology was used, stating: "*with the appropriate safeguards on the industry* [water supplies] *should be safe*".[26] The review also noted that Australia has developed significant water management capabilities including: water treatment, operations and infrastructure for water and fluids management, management of by products such as salts, waste disposal, remediation and rehabilitation, through research carried out by national science institutions, such as the CSIRO and the Bureau of Meteorology.[27]

The Australian Government considers that the current ongoing and long term approach to groundwater baseline data collection and analysis correctly approaches questions of the effects of CSG developments on water. The Underground Water Impact Report (UWIR) for the Surat Cumulative Management Area (CMA)[28] demonstrates how consistent groundwater baseline data collection, reporting and availability can lead to greater ongoing utilisation of the data in assessing cumulative impacts of CSG activities.

Water allocation for shale and tight gas operations in water-scarce areas also requires careful consideration. In contrast to CSG activities, the remoteness and current scale of Australian shale gas and tight gas operations has, to date, minimised community impact and concern. There is an opportunity to coordinate efforts with state and territory governments to collect baseline environmental data on water resources now to inform decisions about the future development of shale gas and tight gas.

Greenhouse Gas Emissions

The Department of the Environment has been conducting research into fugitive emissions from the unconventional gas sector to better understand sources of these emissions, and inform policy options for their reduction.

Information about emissions, and energy consumption and production, from unconventional gas exploration, extraction and distribution is reported to the Australian Government by facility operators under the National Greenhouse and Energy Reporting (NGER) system. This system feeds information into the National Greenhouse Accounts,

[26] http://www.abc.net.au/news/2014-10-01/nsw-chief-scientist-csg-report-published/5781010
[27] NSW Government (2014). *Final Report of the Independent Review of Coal Seam Gas Activities in NSW*; http://www.chiefscientist.nsw.gov.au/__data/assets/pdf_file/0005/56912/140930-CSG-Final-Report.pdf
[28] https://www.dnrm.qld.gov.au/ogia/role

prepared by the Department of the Environment, which is reviewed each year for consistency with Intergovernmental Panel on Climate Change guidelines, accuracy, completeness and comparability by experts assembled by the United Nations Framework Convention on Climate Change.

CSIRO's research into emission profiles from unconventional gas extraction in Australia, commissioned by the Department of the Environment, is summarised in its 2014 report *Field Measures of Fugitive Emissions from equipment and well casings in Australian Coal Seam Gas Production Facilities*.[29] This research found that emission rates in the sample of wells studied are consistent with rates reported in the National Greenhouse Accounts. The Department of the Environment is funding additional CSIRO research to inform future updates of emissions estimation methods under NGER for use by unconventional gas extraction operators.

Community concerns about hydraulic fracturing

The Australian Government considers that the risks associated with hydraulic fracturing can be effectively managed if operations adhere to industry best practice and relevant standards prescribed by regulation. This is based on:

1. The Australian Council of Learned Academies' 2013 review of unconventional gas technologies and applications. Based on the findings of this review then-President of the Academy of Technological Sciences and Engineering, Dr Alan Finkel, commented publicly:[30]

   "…. overall, you could say that if properly managed, with a good regulatory framework – and Australia is capable of applying good regulatory frameworks – that there is a lot of evidence that fracking is safe."

   "It's like any other technology: if it's not done appropriately, there will be problems."

2. Key findings from the final report of NSW's Chief Scientist and Engineer, Professor Mary O'Kane AC, independent review of CSG activities in NSW, which states:[31]

   "Having considered all the information from these sources and noting the rapid evolution of technological developments applicable to CSG from a wide range of disciplines, the Review concluded that the technical challenges and risks posed by the CSG industry can in general be managed through:

   - *careful designation of areas appropriate in geological and land-use terms for CSG extraction;*

[29] Day, S., Dell'Amico, Fry, R., Javanmard Tousi, H. (2014). *Field Measurements of Fugitive Emissions from Equipment and Well Casings in Australian Coal Seam Gas Production Facilities*. CSIRO, Australia.

[30] ABC Lateline interview with Dr Alan Finkel, 27 October 2015; http://www.abc.net.au/lateline/content/2015/s4340246.htm

[31] NSW Government (2014). *Final Report of the Independent Review of Coal Seam Gas Activities in NSW*; http://www.chiefscientist.nsw.gov.au/__data/assets/pdf_file/0005/56912/140930-CSG-Final-Report.pdf

- *high standards of engineering and professionalism in CSG companies;*
- *creation of a State Whole-of-Environment Data Repository so that data from CSG industry operations can be interrogated as needed and in the context of the wider environment;*
- *comprehensive monitoring of CSG operations with ongoing automatic scrutiny of the resulting data;*
- *a well-trained and certified workforce; and,*
- *application of new technological developments as they become available."*

3. The *Report of the Independent Inquiry into Hydraulic Fracturing in the Northern Territory*[32] by Dr Allan Hawke AC, which concluded:

   "…consistent with other Australian and International reviews, is that the environmental risks associated with hydraulic fracturing can be managed effectively subject to the creation of a robust regulatory regime."

4. The Western Australian Parliament's Standing Committee on Environment and Public Affairs report *Implications for Western Australia of Hydraulic Fracturing for Unconventional Gas*[33], which identified that fracturing technology posed a low risk of having negative impacts on environment, water resources and public health.

Social and Economic

In 2011, the CSIRO established the Gas Industry Social and Environmental Research Alliance (GISERA) to provide relevant scientific information to the Australian gas industry, government and community. Through a partnership with Australia Pacific LNG Pty Limited and later QGC Pty Limited, more than $14 million has been spent over five years to research the environmental, social and economic impacts of the CSG industry across Queensland. On 11 August 2015, the Australian and New South Wales Governments announced $3 million to extend GISERA into New South Wales.

The Department of Industry, Innovation and Science's Office of the Chief Economist 2015 *Review of the socioeconomic impact of coal seam gas in Queensland*[34] assessed past socioeconomic research findings. This study indicated that the economic impacts of CSG development in Queensland have been positive, including increases in employment, income, consumption and government revenue.

[32] Hawke, A. (2014). *Report of the Independent Inquiry into Hydraulic Fracturing in the Northern Territory*; http://www.hydraulicfracturinginquiry.nt.gov.au/docs/report-inquiry-into-hydraulic-fracturing-nt.pdf

[33] Parliament of Western Australia (2015). *Implications for Western Australia of Hydraulic Fracturing for Unconventional Gas*; http://www.parliament.wa.gov.au/parliament/commit.nsf/(Report+Lookup+by+Com+ID)/74E61E739E39E57748257EF9002150FE/$file/ev.fra.151117.rpf.042.xx.pdf

[34] Commonwealth of Australia (2015). *Review of the socioeconomic impacts of coal seam gas in Queensland*; http://www.industry.gov.au/Office-of-the-Chief-Economist/Publications/Documents/coal-seam-gas/Socioeconomic-impacts-of-coal-seam-gas-in-Queensland.pdf

Growth of the CSG industry has created both direct and indirect jobs, particularly in the construction and professional services sectors.[35] The unemployment rate in the Surat Basin decreased from 5.9 to 3.1 per cent between 2001 and 2011, and in the Bowen Basin from 4.3 to 2.2 per cent.[36] Over the same period, family income grew by 12 to 15 per cent in areas where CSG development was occurring compared to the rest of Queensland.[37] Business income in certain towns showed a five-fold increase in one year.[38]

In 2012–13, direct value added from the CSG sector (including salaries to direct full-time employees, purchases of goods and services and community contributions) was $13.3 billion, and second round value added (supply chain and consumption effects) was $9.5 billion.[39]

The economic importance of the unconventional gas industry to Australia has been recognised in establishment of the Australian Government's Oil, Gas and Energy Resources Growth Centre, National Energy Resources Australia (NERA)[40] and the Industry Growth Centre for the mining equipment, technology and services sector, METS Ignited.[41] NERA is working with the oil, gas, coal and uranium sectors to improve competitiveness, collaboration and productivity. METS Ignited is working with Australian suppliers to the mining industry, global miners, and research organisations to enhance the global competitiveness of the Australian mining equipment, technology and services industry. The Australian Government is providing $15.4 million (GST inclusive) over four years to each of the Growth Centres.

Agriculture and Landholders

The COAG Energy Council's *Multiple Land Use Framework*[42] (MLUF) supports a balanced approach to multiple and sequential land access, including negotiating access arrangements in good faith. It focuses on the overall principle that to maximise the social and economic benefit, land should not be put to a single use purpose without considering other potential uses. Each jurisdiction implements the MLUF in a way which allows it to operate most effectively alongside existing regulation and land rights.

Work being completed under the Australian Government's *Domestic Gas Strategy* will provide more scientific information to all stakeholders, including landholders.

[35] Fleming, D.A. and Measham, T.G. (2015). Local economic impacts of an unconventional energy boom: the coal seam gas industry in Australia. *The Australian Journal of Agricultural and Resource Economics* 59, 78-94.
[36] Queensland Government Statistician's Office (2015). *Queensland Regional Profiles*; http://statistics.qgso.qld.gov.au/qld-regional-profiles.
[37] Fleming, D.A. and Measham, T.G. (2015). Local economic impacts of an unconventional energy boom: the coal seam gas industry in Australia. *The Australian Journal of Agricultural and Resource Economics* 59, 78-94.
[38] Katherine Witt, University of Queensland, personal communication (based on analysis of ATO data).
[39] Queensland Resources Council (2014). *Economic report*; https://www.qrc.org.au/01_cms/details.asp?ID=3473
[40] http://www.nera.org.au/
[41] http://www.metsignited.org/
[42] COAG Energy Council (2013), *Multiple Land Use Framework;* http://scer.govspace.gov.au/files/2013/12/Endorsed-MLUF.pdf

The approaches to implementing access arrangements vary between state and territory governments but they broadly adhere to the MLUF principles of:

- Negotiating access agreements between the landholder and explorer, including determining the terms and conditions of access;
- Requiring notification of the landholder prior to the commencement of activities; and
- Compensating the landholder by the mining or exploration company for any loss arising from the activities, and mechanisms for arbitration and review.

There are many examples of landholders successfully negotiating land access agreements that provide additional income. Industry statistics indicate that, across Australia, there are currently around 5,160 agreements in place.[43]

ToR 1c: Government and non-Government services and assistance for those affected

The Rural Financial Counselling Service Programme,[44] which has been operating since 1986, provides free financial counselling services nationally to farmers, fishing enterprises and small, related businesses suffering financial hardship. This is an ongoing Australian Government programme, administered by the Department of Agriculture and Water Resources.

The Australian Small Business and Family Enterprise Ombudsman has been established to act as a Commonwealth-wide advocate for small businesses and family enterprises, and to assist in disputes resolution. The Ombudsman can assist in the resolution of individual matters.

States have arrangements that specifically deal with land access disputes. The Queensland Government has established a framework to help resolve land access disputes, comprising the *Mineral Resources Act 1989*, *Geothermal Energy Act 2010*, *Greenhouse Gas Storage Act 2009*, *Petroleum Act 1923* and *Petroleum and Gas (Production and Safety) Act 2004*, which allow a party that has not entered into a conduct and compensation agreement or deferral agreement to seek mediation, a conference, or another dispute resolution process. In New South Wales, the Land and Water Commissioner helps to ensure the protection of landholders' rights in the land access process, and arbitration can be sought under the *Petroleum (Onshore) Act 1991*.

ToR 1d: Compensation and insurance arrangements

The Australian Government is not involved in compensation or insurance arrangements in relation to unconventional gas development.

[43] Australian Petroleum Production and Exploration (2015), *CSG Industry Data Third Quarter 2015;* http://www.appea.com.au/wp-content/uploads/2015/12/Q3-2015-Industry-Data.pdf

[44] http://www.agriculture.gov.au/ag-farm-food/drought/assistance/assistancerural-financial-counselling-service

ToR 1e: Compliance and penalty arrangements

The Department of the Environment is responsible for a range of compliance and enforcement functions under the EPBC Act, where projects trigger the provisions of the EPBC Act. These functions complement states and territories' arrangements.

The EPBC Act includes enforcement mechanisms for managing suspected or identified instances of non-compliance and for reviewing the compliance of referred projects. Non-compliance can attract significant penalties. The Australian Government's approach to maximising compliance with the EPBC Act is outlined in the Department of the Environment's EPBC Act Compliance and Enforcement Policy.[45]

The Department of the Environment implements a Compliance Monitoring Program to ensure EPBC Act approval holders comply with their approval conditions. This program ensures departmental resources are targeted towards those activities that provide the greatest risk to matters of national environmental significance. The objectives of the Compliance Monitoring Program are to:

- Educate stakeholders whose activities may cause environmental harm;
- Assist stakeholders to meet requirements under the EPBC Act;
- Share information and work with state and territory regulators;
- Investigate unlawful or environmentally damaging activities; and
- Enforce Australia's national environmental law.

In ensuring approval holders meet their EPBC Act conditions of approval, the Department of the Environment's Compliance Monitoring officers will amongst other things, conduct random and strategic site inspections, desktop reviews of annual compliance reports and undertake or direct environmental audits.

ToR 1f: Harmonisation of federal and state/territory government legislation, regulations and policies

Through the Energy Council, the Australian, state and territory governments have collaboratively developed multiple documents to guide co-ordination of regulation and development of unconventional gas resources. These include the *Multiple Land Use Framework*, the *National Harmonised Regulatory Framework for Natural Gas from Coal Seams*, and the *Australian Gas Market Development Plan*[46], which demonstrate that governments are harmonising policies around land access and the gas market. The *Coal*

[45] Commonwealth of Australia (2013). *Compliance and Enforcement Policy Environment Protection and Biodiversity Conservation Act 1999;* http://www.environment.gov.au/system/files/resources/2caa19c8-4393-4ffa-be0c-ed246f93f604/files/epbc-act-compliance-enforcement-policy_1.pdf

[46] COAG Energy Council (2015) *Gas Market Development Plan Summary;* http://www.scer.gov.au/sites/prod.energycouncil/files/publications/documents/Australian%20Gas%20Market%20Development%20Plan%20%28July%202015%29.pdf

Seam, Shale and Tight Gas in Australia: Resources Assessment and Operation Overview 2015[47] is a commitment to improve collection of consistent data on industry activities.

The *National Harmonised Regulatory Framework for Natural Gas from Coal Seams* notes that CSG is, and will continue to be, an important part of eastern Australia's domestic gas supply. It focuses on four key areas of operations that cover the lifecycle of development:

- Well integrity;
- Water management and monitoring;
- Hydraulic fracturing; and
- Chemical use.

The *Gas Supply Strategy* commits the Energy Council to review and update the Framework to incorporate new scientific knowledge. The review will start in 2016.

ToR 1g: Legislative and regulatory frameworks for unconventional gas mining in comparable overseas jurisdictions

In both the Australian Government's *Domestic Gas Strategy* and the Energy Council's *Gas Supply Strategy*, there is a commitment to continue fostering closer links, share knowledge about, and learn from, domestic and international experiences to help increase the Australian Government's collective understanding of the potential impacts and management of unconventional gas development.

The development of the *National Harmonised Regulatory Framework for Natural Gas from Coal Seams* was guided by consideration of existing legislative and regulatory frameworks for unconventional gas mining in other countries, including the United States of America[48] whose existing regulations largely focused on shale gas operations.

The geology of states and territories also influences the development, and need, for regulatory frameworks and standards. As part of its approach to continuous improvement in regulation, the Department of the Environment may look to overseas examples to inform its understanding of the potential impacts and management of unconventional gas activities.

ToR 1h: The unconventional gas industry in Australia as an energy provider

Australia has significant unconventional gas resources. Australia's resources of tight and shale gas have been estimated at 25,052 PJ and more than 1 million PJ, respectively.[49] In

[47] Commonwealth of Australia (2015). *Coal Seam, Shale and Tight Gas in Australia: Resources Assessment and Operation Overview 2015;* https://scer.govspace.gov.au/files/2015/11/UPR-Unconventional-Resources-Report-2015-Final.pdf

[48] Groat, C. and Grimshaw, T. (2012). *Fact-Based Regulation for Environmental Protection in Shale Gas Development.* The Energy Institute, University of Texas.

[49] Cook, P.J., Beck, V., Brereton, D., Clark, R., Fisher, B., Kentish, S., Toomey, J. and Williams, J. (2013). *Engineering energy: unconventional gas production: report for the Australian Council of Learned Academies*; http://acola.org.au/PDF/SAF06FINAL/Final%20Report%20Engineering%20Energy%20June%202013.pdf

2014, economic demonstrated resources of CSG in Australia were 45,553 PJ.[50] Development of Australia's unconventional gas resources is one of the activities to increase energy market competition that the Australian Government pointed to in its *Energy White Paper*.[51]

Australia produced 2,587 PJ of gas in 2014–15. Of this, 445 PJ[52] was supplied by unconventional sources in the form of CSG. CSG accounts for nearly half of gas production in eastern Australia.[53] In the absence of alternative energy supply options, new unconventional gas resources will need to be developed.

The recent significant CSG investment in Queensland happened because of its favourable geology and government policies to encourage gas use. As a result, proven gas reserves[54] in Queensland jumped from 5,000 PJ in 2006 to 40,000 PJ in 2012.[55] Domestic demand alone in the eastern Australia market was not enough to drive this investment. It was the opportunity for gas exports and Australia's experience in LNG that attracted the $60 billion investment seen in eastern Australia. At its peak, nearly 30,000 people were employed in the Queensland gas industry, while over 10,000 ongoing jobs have been created.[56]

Unconventional gas developments in Australia also contribute to global energy supplies. In 2014-15, Australia's total LNG exports were 25 million tonnes.[57] Unconventional gas contributed 3.4 million tonnes to Australia's LNG exports in the 12 months to September 2015.[58] Exports of LNG from unconventional gas projects are forecast to increase to 23.7 million tonnes per annum by 2020[59], which means Australia will surpass Qatar as the world's largest exporter of LNG by 2019. The International Energy Agency (IEA) predicts that global natural gas demand will reach 2791 million tonnes in 2020.[60] Future demand growth for energy will be driven by emerging economies such as India, and across Asia. Australia is well placed to help meet this demand through future LNG exports.

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[50] Commonwealth of Australia (2016). *Energy in Australia 2015*; http://www.industry.gov.au/Office-of-the-Chief-Economist/Publications/Documents/energy-in-aust/Energy-in-Australia-2015.pdf

[51] Commonwealth of Australia (2015). *2015 Energy White Paper*; http://ewp.industry.gov.au/sites/prod.ewp/files/EnergyWhitePaper.pdf

[52] Commonwealth of Australia (2016). *Energy in Australia 2015*; http://www.industry.gov.au/Office-of-the-Chief-Economist/Publications/Documents/energy-in-aust/Energy-in-Australia-2015.pdf

[53] Commonwealth of Australia (2016). *Energy in Australia 2015*; http://www.industry.gov.au/Office-of-the-Chief-Economist/Publications/Documents/energy-in-aust/Energy-in-Australia-2015.pdf

[54] 'Reserves' are defined as those resources being economic to develop.

[55] Energy Quest (2013). *Australian Coal Seam Gas 2013: All Aboard the LNG Train*, p.48.

[56] Commonwealth of Australia (2015). *Review of the socioeconomic impacts of coal seam gas in Queensland*, http://www.industry.gov.au/Office-of-the-Chief-Economist/Publications/Documents/coal-seam-gas/Socioeconomic-impacts-of-coal-seam-gas-in-Queensland.pdf

[57] Commonwealth of Australia (2016). *Energy in Australia 2015*; http://www.industry.gov.au/Office-of-the-Chief-Economist/Publications/Documents/energy-in-aust/Energy-in-Australia-2015.pdf

[58] EnergyQuest (2015). *Energy Quarterly, November 2015*.

[59] Australian Energy Market Operator (2015). *National Gas Forecasting Report;* http://aemo.com.au/Gas/Planning/Forecasting/~/media/Files/Gas/Planning/Reports/NGFR/2015/2015%20National%20Gas%20Forecasting%20Report.ashx

[60] International Energy Agency (2015). *World Energy Outlook, 2015 Edition*. Organisation for Economic Co-operation and Development and International Energy Agency, Paris.

Ongoing exploration contributes to the growth in unconventional gas production and will ensure that it continues to be a major source of energy for Australia. Unconventional gas resources will need to be developed over the coming decades to supply both future domestic and export energy demand. Increased energy security and further economic benefits can be realised from the development of additional CSG resources in eastern Australia, and from shale and tight gas resources principally in northern and central Australia, and Western Australia.

ToR 1i: The current royalty and taxation arrangements associated with unconventional gas mining

The Petroleum Resource Rent Tax (PRRT) is a profit-based tax levied by the Australian Government. The PRRT has applied to offshore oil and gas production since 1986 and onshore oil and gas production since 2012. It is levied at 40 per cent of taxable profit (sales receipts less eligible expenditures). The PRRT only applies once companies have recovered a return commensurate with the risks involved in petroleum exploration and development.

Certain Australian Government and state and territory excise and royalties (resource taxes) apply to onshore petroleum projects. These resource taxes are creditable against the assessable receipts of petroleum projects to avoid double taxation.[61]

ToR 1j: Any related matter

No comment.

Summary

Natural gas as an energy source is long-standing, with CSG already accounting for more than half of domestic gas production in eastern Australia. Natural gas, including CSG, will continue to play an important role in Australia's energy future, both as a domestic energy source and for export, whilst providing economic benefits for all Australians.

The Australian Government considers that the potential environmental risks and social impacts associated with the unconventional gas industry can be responsibly and effectively managed through existing jurisdictional statutory and policy frameworks.

Government policies reflect the co-operation between the Australian, state and territory governments in ensuring the safe and responsible development of the unconventional gas industry. Existing jurisdictional statutory and policy frameworks ensure that development of the industry can be balanced with community expectations and environmental protection. Australian, state and territory governments continue to invest in gathering robust scientific information for policy development and decision making. Within this framework the role of industry in adhering to best-practice is critical.

[61] This is achieved by grossing up payments of resource taxes in relation to a petroleum project by the PRRT rate, which is then deductible against assessable receipts of that petroleum project.

The Australian Government recognises that regulation and policy development has matured in response to the development and expansion of the unconventional gas industry. There is now satisfactory evidence from scientific studies and historical reviews of CSG activities to enable effective regulation, as well as preparing for the establishment of an Australian shale and tight gas industry.

Appendix A: Current Regulatory Initiatives

Proposed legislative amendments related to the 'water trigger' and the IESC
The Australian Government has introduced amendments to the EPBC Act to facilitate the introduction of approval bilateral agreements and to strengthen the role of the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC) via the *Environment Protection and Biodiversity Conservation Amendment (Bilateral Agreement Implementation) Bill 2014*.[62]

The Bill was introduced on 14 May 2014 and is currently before the Senate. The Bill originally included proposed amendments that would have allowed the 'water trigger' to be included in the scope of approval bilateral agreements. In response to community concerns, the Government moved amendments to the Bill in the Senate on 14 September 2015 to remove this proposed change.

The Bill includes a series of provisions to strengthen the role of the IESC, by:

- Expanding the IESC's role so it can provide advice to the Minister for the Environment about the operation of an assessment bilateral agreement that accredits a state or territory for the water trigger. For example, this could include advice on the extent to which a state has taken IESC advice into account in relation to a particular assessment.
- Enabling all Australian states and territories to directly seek advice from the IESC, ensuring they have access to the best available science. Currently, only Queensland, New South Wales, Victoria and South Australia (NPA signatory states) can seek and receive advice from the IESC.

Assessment Bilateral Agreements under the EPBC Act
Throughout 2013 and 2014, new or revised assessment bilateral agreements[63] were signed with all state and territory governments. The new agreements with state governments that are party to the NPA stipulate that IESC advice will be sought for all CSG (and large coal mining) developments that are likely to have a significant impact on a water resource. Additionally, these agreements include a commitment by states to make joint referrals to the IESC. This ensures that the Minister for the Environment's statutory obligation to obtain and take into account IESC advice is met concurrently with the NPA state's obligation. This in turn aims to avoid unnecessary delays to the approval process following the state government's assessment of a development.

Australian Government policies, such as the *EPBC Act Condition setting policy*[64], seek to minimise duplication of approval conditions between the Australian Government and state government regulators, while maintaining high environmental standards.

[62] www.aph.gov.au/Parliamentary_Business/Bills_Legislation/Bills_Search_Results/Result?bId=r5231
[63] www.environment.gov.au/epbc/one-stop-shop
[64] www.environment.gov.au/epbc/publications/

Appendix B: Past Reviews

Below is a non-exhaustive list of parliamentary and government initiated reports that have considered issues related to unconventional gas.

- **Commonwealth**
  - Senate Rural Affairs and Transport References Committee, *Management of the Murray Darling Basin Interim report: the impact of mining coal seam gas on the management of the Murray Darling Basin* (2011).
  - Standing Council on Energy and Resources (now COAG Energy Council), *National Harmonised Regulatory Framework for Natural Gas from Coal Seams* (2013).
  - Productivity Commission, *Mineral and Energy Resource Exploration* (2014).
  - Environment and Communications Legislation Committee inquiry and report on Landholders' Right to Refuse (Gas and Coal) Bill 2015.

- **Victoria**
  - In May 2012, the Victorian Parliament's Joint Economic Development and Infrastructure Committee completed an inquiry into greenfields mineral exploration and project development in Victoria.[65]
  - In 2013, the Hon Peter Reith AM chaired a Victorian Gas Market Taskforce inquiry that considered gas supply issues.[66]
  - In May 2015, the legislative Council referred an inquiry into unconventional gas in Victoria to its Environment and Planning Committee.[67]
  - In December 2015, the Parliament of Victoria's Environment and Planning Committee released its final report for the Inquiry into Onshore Unconventional Gas in Victoria.[68]
  - In mid-2016, the Victorian Government is expected to table its response to the inquiry.

- **Northern Territory**
  - In March 2014, The Northern Territory (NT) Government appointed Dr Allan Hawke AC to conduct an inquiry into hydraulic fracturing.

[65] Parliament of Victoria (2012). *Inquiry into greenfields mineral exploration and project development in Vinctoria; http://www.parliament.vic.gov.au/57th-parliament/edic/inquiries/article/1391*

[66] Victoria Government (2013). *Gas Market Task Force Report;* www.energyandresources.vic.gov.au/about-us/publications/Gas-Market-Taskforce-report

[67] Parliament of Victoria (2015). *Inquiry into onshore unconventional gas in Victoria;* http://www.parliament.vic.gov.au/images/stories/committees/SCEP/GAS/Report/EPC_58-03_Text_WEB.pdf

[68] Parliament of Victoria (2015). *Inquiry into onshore unconventional gas in Victoria;* http://www.parliament.vic.gov.au/images/stories/committees/SCEP/GAS/Report/EPC_58-03_Text_WEB.pdf

- In February 2015, the Northern Territory (NT) Government released the report of an independent inquiry into hydraulic fracturing and broadly accepted all six of the report recommendations.[69]
- In November 2015, NT Government released a draft version of its *Oil and Gas Industry Development Strategy*.[70]

- **Queensland**
  - The Queensland Competition Authority has reviewed the regulation of the CSG industry, with its final report provided to the Queensland Government in January 2014.[71]

- **New South Wales**
  - Between 2011 and 2012, a committee of the Legislative Council conducted an inquiry into CSG.[72]
  - In 2014, after being commissioned by the NSW Government to do so, Mr Bret Walker SC completed an independent review of the process for arbitrating land access arrangements for mining and petroleum exploration. [73]
  - In September 2014, the NSW Chief Scientist and Engineer published the *Final Report of the Independent Review of Coal Seam Gas Activities in NSW.*[74] The NSW Government has accepted all of the NSW Chief Scientist and Engineer's recommendations in its *NSW Gas Plan.*[75]

- **Western Australia**
  - In July 2011, the Government of Western Australia (WA) commissioned Dr Tina Hunter to review the existing regulatory framework for shale gas resources, *Regulation of Shale, Coal Seam and Tight Gas Activities in Western Australia.*[76]

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[69] http://chiefminister.nt.gov.au/media-releases/hawke-report-released Hawke, A. (2014). *Report of the Independent Inquiry into Hydraulic Fracturing in the Northern Territory*; http://www.hydraulicfracturinginquiry.nt.gov.au/docs/report-inquiry-into-hydraulic-fracturing-nt.pdf

[70] Northern Territory Government (2015). *Oil and Gas Industry Development Strategy;* https://onshoregas.nt.gov.au/__data/assets/pdf_file/0003/195591/Oil-Gas-INDUSTRY-Strategy.pdf

[71] Queensland Competition Authority (2014). *Coal Seam Gas Review*; http://www.qca.org.au/Other-Sectors/Productivity/Completed-Reviews/Coal-Seam-Gas

[72] Parliament of NSW. www.parliament.nsw.gov.au/prod/parlment/committee.nsf/0/318A94F2301A0B2FCA2579F1001419E5?open&refnavid=CO3_1

[73] NSW Government (2014). *Land access arbitration framework (walker review)*; http://www.resourcesandenergy.nsw.gov.au/landholders-and-community/landholders-rights/walker-review-of-land-arbitration-framework

[74] NSW Government (2014). *Final Report of the Independent Review of Coal Seam Gas Activities in NSW*; http://www.chiefscientist.nsw.gov.au/__data/assets/pdf_file/0005/56912/140930-CSG-Final-Report.pdf

[75] NSW Government (2014). *NSW Gas Plan*; http://www.resourcesandenergy.nsw.gov.au/energy-supply-industry/legislation-and-policy/nsw-gas-plan

[76] Hunter, T (2011). *Regulation of Shale, Coal Seam and Tight Gas Activities in Western Australia*; http://www.dmp.wa.gov.au/Documents/Petroleum/PD-SBD-NST-116D.pdf

- In November 2015, the WA Legislative Council concluded an inquiry into the implications of hydraulic fracturing with the release of *Implications for Western Australia of Hydraulic Fracturing for Unconventional Gas*.[77]

- **South Australia**
  - The Parliament of SA Natural Resources Committee is currently undertaking an inquiry into potential risks and impacts in the use of hydraulic fracture stimulation to produce gas in the south-east of SA.[78] An interim report was released on 17 November 2015, with a final report expected to be tabled in mid-2016.

- **Tasmania**
  - In 2015, the department of Primary Industries, Parks, Water and Environment completed a review of hydraulic fracturing.[79]

[77] Parliament of Western Australia (2015). *Implications for Western Australia of Hydraulic Fracturing for Unconventional Gas*; http://www.parliament.wa.gov.au/parliament/commit.nsf/(Report+Lookup+by+Com+ID)/74E61E739E39E57748257EF9002150FE/$file/ev.fra.151117.rpf.042.xx.pdf

[78] https://www.parliament.sa.gov.au/Committees/Pages/Committees.aspx?CTId=5&CId=175

[79] Tasmanian Government (2015). *Review of Hydraulic Fracturing in Tasmania Final Report 25 February 2015*; http://dpipwe.tas.gov.au/Documents/Review%20of%20hydraulic%20fracturing%20in%20Tasmania%20-%20Final%20Report%20%2025%20Feb%2015.pdf