

Coal and gas mining in Australia

Opportunities for national law reform

Technical Brief No. 24
August 2013
ISSN 1836-9014

Prepared by the Australian Network of Environmental Defender's Offices

About TAI

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Our philosophy

As we begin the 21st century, new dilemmas confront our society and our planet. Unprecedented levels of consumption co-exist with extreme poverty. Through new technology we are more connected than we have ever been, yet civic engagement is declining. Environmental neglect continues despite heightened ecological awareness. A better balance is urgently needed.

The Australia Institute's directors, staff and supporters represent a broad range of views and priorities. What unites us is a belief that through a combination of research and creativity we can promote new solutions and ways of thinking.

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The Institute aims to foster informed debate about our culture, our economy and our environment and bring greater accountability to the democratic process. Our goal is to gather, interpret and communicate evidence in order to both diagnose the problems we face and propose new solutions to tackle them.

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Foreword by The Australia Institute

Mining has always been an important part of the Australian economy.

What has changed is the unprecedented scale and pace of its expansion. This is already irrevocably altering the Australian landscape and affecting food production, water security and communities across the nation.

The coal seam gas fields approved to date in Queensland will cover tens of thousands of square kilometres with an industrial grid of wells, pipelines, roads and water treatment plants. They will feed three huge gas processing plants being constructed within the Great Barrier Reef World Heritage Area on Curtis Island. There are proposals to increase this threefold.

Australia is already the second largest coal exporter in the world, but with a series of “mega mines” there are plans to significantly increase the amount of coal we mine and export within the decade.

These huge projects are staggering in size. No one visiting Central Queensland or the Hunter Valley in NSW would be left in any doubt that they are transforming Australia’s rural landscape. However, it is the impacts that we don’t see that are often the most serious.

Coal mines and coal seam gas drilling disrupt aquifers that are essential to farmers and the natural environment. Coal mines are known to have discharged large amounts of contaminated water into our river systems, and no-one knows what to do with the huge amounts of contaminated water and salt that result from dewatering coal seams for gas drilling.

The human health impacts of coal are well documented and greenhouse gases that result from burning Australian coal and gas are a major contributor to climate change.

While these impacts are primarily social and environmental, they are also fundamentally economic issues. Industrialisation of rural areas directly impacts on the agricultural and tourism industries, and damage to the environment and people’s health is ultimately paid for by the community.

The Australia Institute has always been concerned with a broad range of economic, social and environmental issues that are essential to Australia’s future. All of these are impacted in a multitude of ways by Australia’s coal and gas expansion.

State governments have had the primary responsibility for managing resource development in Australia, but have failed to find an appropriate balance between the interest of the mining industry and the rest of the community.

These activities will have a profound impact on all Australians for many generations. As such, we believe it is time to look carefully at how the Commonwealth government can protect our food, water, environment and communities.

The policy question that always motivates The Australia Institute is ‘what should be done?’ Over the past three years we have published dozens of research papers which highlight the economic, social and environmental consequences of the unprecedented expansion of the fossil fuel extraction industry. We are proud to publish this research by the Australian Network of Environmental Defender’s Offices to help start the conversation about what we need to do about it.

Acknowledgements

This options paper was prepared by the Australian Network of Environmental Defender's Offices Inc. (ANEDO).

All opinions expressed and any errors made are those of the authors.

Introduction

The purpose of this report is to identify existing Commonwealth law and policy relevant to the regulation of coal mining and unconventional gas exploration and production in Australia. Having identified the regulatory gaps, this report outlines opportunities for law reform in 10 key areas, with an emphasis on ecologically sustainable development (ESD) and decision-making based on best-available science.

Why national law reform is needed

A report of this nature is timely and necessary given the degree of concern expressed by communities across Australia about the impacts of mining in general, and coal mining and unconventional gas development in particular.¹ This concern has arguably been driven by two central factors.

The first factor is the number and size of production titles for these resources, which taken together cover large portions of affected States and Territories. Similarly, the number and scale of actual and projected exploration and production activities (including ancillary infrastructure) is significant.² With tenements covering large parts of almost all Australian States and Territories, and exploration and production often associated with considerable environmental and social impacts, there is a critical need for national laws and standards regulating these industries. Put simply, the magnitude of these activities results – and will continue to result - in pronounced, cumulative impacts on Australian communities, agricultural industries, air and water quality, and environment.³

The second factor is the current inadequacy of State and Territory regulation of coal mining and unconventional gas development. Coal mining development and unconventional gas development are principally regulated by State and Territory governments. State and Territory laws regulating these activities are deficient, particularly in respect of biodiversity conservation, greenhouse gas (GHG) emissions, air quality, water resources, chemical use and access to land.⁴ Key inadequacies relate to environmental assessment and approval processes. State and Territory legislation predominantly confers broad discretion on decision-makers to determine how environmental and social impacts will be assessed and whether or not high-impact mining projects will be approved.⁵ It is also characterised by legislation which limits the extent to which a decision-maker or court may consider environmental impacts when determining a development application for a coal mining development or CSG development.⁶

Power to reform

Management, regulation and protection of Australia's biodiverse and resource-rich environment has given rise to a unique set of legal challenges, not least of all because the Constitution of Australia does not expressly empower the Commonwealth to create environmental or resource management laws. The Commonwealth may only pass laws based on 'powers' specified in the Constitution. This means that certain areas may only be regulated by the States and Territories. These powers have been broadly interpreted by the High Court so as to afford the Commonwealth increasing scope to legislate in areas that were once thought to be the sole domain of State and Territory Parliaments. Since Federation in 1901, successive Australian governments and the High Court have examined, defined and redefined the complex relationship between States' rights and Commonwealth legislative powers.

It is now clear that the Commonwealth may rely on a range of constitutional 'powers' to create laws to manage our environment in accordance with the principles of ESD. It is also

clear that they may regulate coal mining and unconventional gas development in order to protect Australia's unique natural heritage and food producing land.

The Constitution of Australia

The Constitution does not include a 'mining power', a 'land use power', an 'agriculture power' or an 'environmental power.' As a result, it is necessary to determine which of the other powers may be used to enable the Commonwealth to pass laws regulating coal mining and unconventional gas development for the purposes of implementing ESD. Based on our analysis of High Court cases and/or existing legislation, we are of the view that Commonwealth Government is able to rely on the following powers to regulate aspects of coal mining and unconventional gas development:

- *External affairs power – s. 51 (xxix)*

The external affairs power enables the Commonwealth to create laws regulating the environmental impacts of coal mining and unconventional gas development, as long as those laws constitute proper implementation of the environmental treaties to which Australia is a signatory.⁷

- *Corporations power – s. 51 (xx)*

The 'corporations power' confers broad power on the Commonwealth to legislate in respect of most areas directly or indirectly relevant to the operation of corporations covered by s. 51 (xx). Corporations covered by s. 51 (xx) are 'foreign corporations, and trading or financial corporations formed within the limits of the Commonwealth' (**constitutional corporations**).⁸ This arguably includes the activities of mining companies and unconventional gas companies, including the construction and operation of ancillary infrastructure. Almost all corporations undertaking coal mining or unconventional gas development (including statutory corporations) would clearly satisfy the definition of a 'constitutional corporation'. Notable exceptions would include incorporated associations that undertake various activities, including mining. However, it is entirely possible that in applying the 'activities test', these entities could still be classified as 'constitutional corporations'.⁹

- *Trade and Commerce power – s. 51 (i)*

The trade and commerce power allows the Commonwealth to make laws with respect to 'trade and commerce with other countries, and amongst the States.' The power enables the Commonwealth to regulate interstate and overseas trade and commercial activities of coal mining companies and unconventional gas companies. This would include most aspects of 'transporting' goods from one place to another (that is, interstate or overseas). It also includes background negotiations and financial transactions. While Commonwealth legislation regulating trade or commercial aspects of coal mining and unconventional gas in Australia must not advantage or disadvantage operators (including electricity generators, retailers etc.) in one State (relative to operators in other States) (section 92); the power enables the Commonwealth to:

- regulate those aspects of mineral and petroleum extraction that may impact – positively or negatively – on the export of those products
- pass laws regulating the environmental impacts of coal mining and unconventional gas activities where the final products are being exported. This may extend to refusing to grant an export licence

- regulate intrastate trade of coal or unconventional gas (or associated activities) where it is inextricably connected to interstate or export trade.¹⁰

- *Territories power – s. 122*

The ‘territories power’ enables the Commonwealth to pass laws that apply to Australian territories, that is the Northern Territory, the Australian Capital Territory, as well as external territories. The ‘territories power’ is a plenary power which means the Commonwealth is not limited to creating laws covered by the other powers in the Constitution.¹¹ For example, it is more than likely that the ‘territories power’ could be relied upon by the Commonwealth to regulate shale gas exploration and production in the Northern Territory.

- *Incidental power – s. 51 (xxxix)*

The Commonwealth may pass laws that are ‘incidental’ to the exercise of any other powers in the Constitution. Laws that are ‘incidental’ to the exercise of a power generally regulate something that is indirectly connected to a subject regulated by that power. For example, the export of minerals could be described as a legitimate subject of the ‘trade and commerce power’; according to the High Court, regulating the environmental impacts of mining is indirectly connected to this subject. The court was able to reach this conclusion because there was a sufficient connection between the regulation of these impacts and the export of the minerals.¹²

In addition to unilateral Commonwealth legislation based on these five Constitutional powers, there are a number of cooperative processes that can and have been used to determine responsibility for natural resource management in Australia. Federal policy coordination and the development of agreements through COAG should be used in relation to strengthening regulation of coal and unconventional gas mining in Australia to ensure such activities are consistent with ecologically sustainable development.

There is therefore no strictly legal impediment to implementing the 10 areas of law reform recommendations contained in this report. Rather, inter-governmental cooperation and political will are necessary if the community’s expectations regarding regulation of these industries are to be met.

Methodology

For each area of reform this report identifies:

1. Issue/problem
2. Current law and policy
3. Useful precedents or case studies
4. Solution/recommendation for reform

1. Protect agricultural land by strengthening the legislative force of National Food Plan and Australian Food Council

1. Issue/problem

The impacts of mining on agricultural land generally fall into two broad categories. The first is land acquisition, for example where an approval condition will require the mining company to

purchase properties for sale within the ‘zone of affectation’. As the zone of affectation comprises all privately owned residential and rural properties closest to the mine, the impacts in this area are often significant, particularly when the development is a large, open-cut coal mine. Generally speaking, landholders cannot be forced to sell their properties.¹³ However, many feel pressured to do so to avoid the noise, dust and other environmental impacts associated with these developments, despite what may amount to less than ideal compensation arrangements.¹⁴ The second category comprises impacts on landholders who remain in possession of their land while exploration or mining activities take place on or in the vicinity of their property. Clearly coal and unconventional gas mining can impact on current land uses such as agriculture and food production. For example, longwall mining beneath agricultural land can result in subsidence, with research indicating that this may reduce crop yields.¹⁵

2. Current law and policy

Land use has been historically regulated by State and Territory governments and local councils.¹⁶ As such, there are currently no Commonwealth laws which directly regulate coal mining or unconventional gas development on or near agricultural land. There are environmental laws and recent land use policies that are relevant to agricultural land, but do not specifically address the impacts of mining on food production. These are summarised below. Other Commonwealth laws that have implications for agricultural land – such as water management legislation – are discussed elsewhere in this Report.

Environment Protection Biodiversity Conservation Act 1999 (EPBC Act)

The EPBC Act can indirectly regulate coal mining or unconventional gas development on or near agricultural land. However, the EPBC Act is only triggered if a coal or unconventional gas development or ‘action’ is likely to have a significant impact on a matter of national environmental significance (**NES**) – such as a threatened species, recognised wetland or water resource. (These matters are discussed further in parts 5 and 7 of this report). As such, it is limited in its application. Even where a mining activity does trigger the Act, the most likely outcome is that the Minister will issue a ‘conditional approval’. While conditions are designed to mitigate the impacts of the development, they must relate to the matter of NES.¹⁷ In other words, the Minister could not impose conditions to protect agricultural land or guarantee food security, as these are not matters of NES.

National Harmonised Regulatory Framework for Natural Gas from Coal Seams, 2013¹⁸

The Council of Australian Governments Standing Council on Energy and Resources (**COAG SCER**) recently released a ‘National Harmonised Regulatory Framework for Natural Gas from Coal Seams’ (**CSG Framework**). The CSG Framework identifies 18 leading practices across four areas that may be adopted by State Governments. The four areas are: well integrity; water management; hydraulic fracturing; and chemical use.¹⁹ However, while the 18 leading practices could in theory reduce some of the impacts of CSG development on agricultural land, the CSG Framework ‘does not require developing new, specific legislation in all jurisdictions, as many jurisdictions already have in place legislation and regulation.’²⁰ Rather, it is designed to ‘provide guidance to regulators’.²¹ Despite being entirely aspirational in nature and limited in its scope, it nonetheless claims to offer ‘assurance for communities and farmers that concerns in relation to protecting and managing both underground and surface water resource in particular are taken seriously by government and are being effectively regulated’.²²

*Multiple Land Use Framework*²³

The CSG Framework is underpinned by the ‘Multiple Land Use Framework’ (**MLUF**). The MLUF, also released by the COAG SCER, is a three page document developed ‘in recognition of the conflict which arises over access to land and land use...’.²⁴ The MLUF includes a list of five desired outcomes, as well as eight general principles intended to achieve these outcomes. The MLUF assumes that CSG development can occur in any landscape, providing impacts are ‘managed’. As EDO NSW argued in a recent submission, ‘this ignores a fundamental need for evidence-based land use planning and NRM [natural resource management] objectives.’²⁵ The MLUF contains a number of deficiencies. First, it is brief, general and to that extent fails to properly consider land use and resource management in the level of detail necessary. Second, it is not evidence-based. Third, none of the five desired outcomes include any reference to environmental protection, including protection of water resources, biodiversity, and air quality in rural areas. Fourth, the guiding principles are clearly directed toward removing barriers to mining in areas of conflict, which would include agricultural land. This is evidenced by the formal category to which the MLUF is assigned by the COAG SCER: ‘Council Priority Issue: Addressing issues impacting on investment in resources exploration and development...’.²⁶ It is further evidenced by a failure to endorse ‘mining exclusion zones’ to protect the environment or food security. As noted by Dr John Williams, exclusions zones operate on the basis that coexistence is not, in certain circumstances, possible.²⁷ This is particularly true where one land use, for example mining development, erodes the viability of another use, for example agriculture and food production.

3. Current law and policy

National Food Plan

The National Food Plan (**NFP**) recognizes that Australia is a significant food-producing nation and this contributes to our high level of food security, and that 90% of fresh food eaten in Australia is domestically produced. Australia exports more than half the food it produces. The NFP was developed to provide leadership and articulate the direction of food-related policies covering areas such as employment, WH&S, agriculture, education, social disadvantage, infrastructure, environment/conservation, industry/innovation, competition, business and the economy. The role of the NFP is to solve challenges in these areas relating to food.

Specific Goals of the NFP include: growing exports by 45%, with exports internationally recognized for quality and sustainability; increasing productivity by 35%; and ensuring infrastructure and biosecurity systems support growing food industry. A clear aim is that Australia will produce food sustainably and will have adopted innovative practices to improve productive and environmental outcomes.

*Australian Council on Food (ACF)*²⁸

The Australian Council for Food (**ACF**) is a consultative forum providing for high-level engagement between key stakeholders in the Australian food system; Australian Government ministers to exchange views, consider long-term strategic challenges for the food system and monitor the implementation of the NFP. Members of the ACF include:

- Government Ministers
 - Minister for Agriculture, Fisheries and Forestry (Chair)
 - Minister for Health
 - Minister for Climate Change, Industry and Innovation
 - Minister for Sustainability, Environment, Water, Population and Communities

- Minister for Trade and Competitiveness and Minister Assisting the Prime Minister on Asian Century Policy
- Minister for Regional Australia, Regional Development and Local Government
- Minister for Families, Community Services and Indigenous Affairs.
- Non-Government stakeholders in these areas:
 - agriculture and fisheries
 - food manufacturing
 - food retail
 - food transport/storage/cold chain
 - public health
 - consumer groups
 - science/research/education
 - community sector
 - environment sector
 - Indigenous/remote communities
 - trade unions.

The rationale of establishing the ACF includes to improve leadership and stakeholder engagement on food-related policy issues, including by providing guidance to the government in implementing the NFP. However, ACF was not established to be a decision-making body and does not replace existing consultative mechanisms. ACF also specifically recognises the need for coordinated participation by different States and Territories. Key areas of focus include regulatory reform, consistent food standards and safety regulations, co-operative initiatives for emergencies and collection of land use information.

Landholders' Right to Refuse (Coal Seam Gas) Bill 2011

In 2011, Senator Larissa Waters tabled the *Landholders' Right to Refuse (Coal Seam Gas) Bill 2011 (CSG Food Bill)*. The CSG Food Bill, if passed, would have made it an offence for a constitutional corporation to engage in CSG activity on food producing land without the prior written authorisation of the owner.²⁹ It also included a section that would have enabled an aggrieved owner to bring an action against a constitutional corporation within six years of allegedly committing the offence.³⁰ 'Food producing land' was defined as 'land that has produced food at any time in the previous 10 years from the day the first coal seam gas mining activity has been, or is proposed to be, undertaken on the land.' The CSG Food Bill provided for owners to furnish CSG companies with prior written authorisation requiring information across seven areas. The CSG Food Bill derived its constitutional validity from the 'corporations power'. It did not intend to exclude the operation of State or Territory laws capable of operating concurrently with the Bill.³¹ We note however, the CSG Food Bill did not intend to apply to coal mining or other forms of unconventional gas.

4. Solution/recommendation for reform

Similar to existing precedents for food related Commonwealth legislation (such as the *Food Standards Australia New Zealand Act 1991*), we recommend:

1. Draft new legislation to address the current regulatory gap in terms of protecting land for food production. The new Act would include 4 key purposes:
 - a. To provide a legislative framework for implementing the goals of the National Food Plan. This could involve a Commonwealth umbrella Act that sets relevant standards that State and Territory legislation must meet.

- b. Provide statutory recognition of the role of the Australian Council on Food and clarify that the ACF has a statutory role in advising the Minister on any developments that are likely to impact negatively on food production. Include a legislative requirement that the relevant Minister approving the activity must take into account the advice from the ACF.
- c. Provide for mandatory exclusion zones (applying to both unconventional gas development and coal mining development) including and around prime agricultural land used for food production. Offence provisions should also apply.
- d. Make it an offence for a constitutional corporation to engage in unconventional gas development on food producing land without the prior written consent of all individuals with an ownership interest in the land.

2. Protect agricultural land by strengthening the legislative force of National Food Plan and Australian Food Council

1. Issue/problem

As the scale of mining operations across Australia increases, communities are observing measurable decreases in local air quality, most notable through increases in particulate matter. A recent Australian Government Senate inquiry on “The impacts on health of air quality in Australia”³² heard testimony from some of Australia’s leading health experts that identified that “particulate air pollution is a matter of serious health concern”.³³ This concern arises because of the strong evidence of a dose-response relationship between particulate matter and health risk, i.e. any increase in particulate air pollution will lead to increase risk to human health. There is no known lower threshold at which this impact does not occur.³⁴ Health risks can range from increased mortality and morbidity to diminished quality of life.³⁵

Particulate matter is generally divided into three categories, commonly known as dust (particulate matter with an equivalent aerodynamic diameter greater than 10 micrometres), PM10 (particulate matter with an equivalent aerodynamic diameter of 10 micrometres or less) and PM2.5 (particulate matter with an equivalent aerodynamic diameter of 2.5 micrometres or less). Both PM10 and PM2.5 have been associated with increased health risks.³⁶ However particulate matter is not the only air pollutant of concern from mining. Coal mines are also often responsible for increases in other pollutants including ozone, nitrogen oxides, and hydrocarbons³⁷ while coal seam gas extraction is also responsible for fugitive methane emissions and the release of other hazardous chemicals, including volatile organic compounds during production and processing.³⁸

1. Current law and policy

National Environment Protection Council Act 1994

The Intergovernmental Agreement on the Environment (**IGAE**) provided for the creation of a cooperative, intergovernmental ministerial council known as the National Environment Protection Council (**Council**), the purpose of which was to create a uniform approach to pollution control in Australia.³⁹ The Council was formally established under the *National Environment Protection Council Act 1994* (**NEPC Act**). The statutory functions of the Council

have now passed to the COAG Standing Council on Environment and Water (**SCEW**).⁴⁰ Mirror legislation has been created in each State and Territory.⁴¹ The SCEW is responsible for formulating National Environment Protection Measures⁴² which may take the form of standards, goals, guidelines or protocols.⁴³

National Environment Protection (Ambient Air Quality) Measure 2003

Particulate matter is regulated at the Commonwealth level by the *National Environment Protection (Ambient Air Quality) Measure 2003 (NEPM)*. NEPM considers levels of particulate pollution as annual averages and daily averages. NEPM currently has a mandatory requirement for daily averages of PM10 to be below 50µg/m³ (with a number of allowable annual exceedances) and advisory standards of 25µg/m³ for daily averages and 8 µg/m³ for annual averages for PM2.5.⁴⁴ A review of the NEPM standards was made available in September 2011.⁴⁵ This review included a number of recommendations designed to strengthen the NEPM standards. Most notably, recommendations included updating the standards to reflect recent findings on health impacts, introducing annual average standards for PM10, making standards for PM2.5 mandatory, removing allowable exceedances for non-natural events and introducing an exposure reduction framework.

In practice, most State and Territory environmental assessments of new coal projects consider air quality impacts against the mandatory and advisory NEPM standards, however not all States and territories have binding standards. Where binding standards do exist, the NEPM framework means they may only apply to large population centres or specified receptors⁴⁶. When projects do consider air quality impacts against NEPM standards, these impacts are usually considered in the context of the mine site and the surrounding community, rather than a broader consideration of activities such as transport of coal off site via train lines to ship loading facilities. The impact of increased particulate matter on the communities affected by associated transport infrastructure is rarely considered.⁴⁷ Assessment of air quality is also lacking the requirement to consider cumulative impacts in light of foreseeable future events (for example already approved projects), as is envisaged by draft guidelines for implementing the recent EPBC amendments that require the impacts of proposed coal seam gas and large coal mining developments on water resources to be assessed at a national level (see part 5 of this report).⁴⁸ In addition while carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, and lead are also regulated through NEPM, other pollutants generated through mining are not.

National Pollutant Inventory

The National Pollutant Inventory (**NPI**), concerns water pollution, air pollution and hazardous wastes.⁴⁹ The goals of the NPI include collecting a broad base of information on ambient emissions and waste transfers of the 93 substances on the statutory reporting list, and ensuring that this information is publicly accessible.⁵⁰ The NPI database contains data from three sources: facility emissions, facility waste transfers, and diffuse or ambient emissions for catchments. Most of the 93 substances are emitted into the air.⁵¹ States and Territories are responsible for collecting data from reporting facilities and developing 'aggregate emissions data'. In practice, industrial facilities that emit more than the statutory threshold for any of these 93 substances must estimate and report emissions to their State or Territory government on an annual basis, while the government estimates emissions from facilities using less than the threshold quantity of these substances, as well as emissions arising from everyday activities, such as emissions from cars.⁵² The Commonwealth is responsible for compiling contextual information, collating data collected by the States and Territories, and publishing this information annually.⁵³ Implementation of the NPI varies between jurisdictions.⁵⁴ While the NPI constitutes an important source of data, it is not a regulatory mechanism. That is, it does not limit or prohibit activities that affect water quality, water quantity, hydrological functioning, or organisms and ecosystems that depend on groundwater

and surface water. Therefore in practice, the NPI only applies to coal mines and unconventional gas developments if they are 'reporting facilities.' Again, a 'reporting facility' is only required to lodge yearly reports with the relevant State or Territory agency; their polluting activities are not circumscribed under the NPI. Rather, this is managed at a State or Territory level.

2. Useful precedents or case studies

US Environment Protection Agency

The United States of America Environment Protection Agency (**US EPA**), established in 1970, is a regulatory agency authorized by Congress to write environmental regulations. The US EPA is responsible for assisting persons and entities with compliance and compliance monitoring to detect breaches in environmental laws and regulations (through civil administrative actions, civil judicial actions and criminal actions). In addition the US EPA sets national standards, which act as the minimum standards for State laws. This national body has a clearly defined role and for example, does not handle environmental concerns in relation to endangered species, destruction of wetlands, development which impacts wildlife, workplace health and safety, noise complaints, or nuclear waste. The large reach of the US EPA ensures that environmental standards, assistance and enforcement are consistently applied across the entire nation.

At the federal level in the US, the environmental impacts of mining are regulated through several different legislative instruments; in particular the **Clean Air and Clean Water Acts**. Under the *Clean Water Act* (section 303), states are required to set their own standards for water quality, with guidance from the US EPA's gold book criteria and water quality standards handbook, and the US EPA is to review the state standards and approve/reject them. Mining permits are not allowed to be issued unless the development is going to comply with these standards. Under the *Clean Air Act* (sections 108 and 109) the US EPA sets the national ambient air quality standards, which are implemented through legislation at the State or tribal level which meets these minimum requirements. Under the *Comprehensive Environmental Response Compensation and Liability Act*, the US EPA may issue Applicable and Relevant and Appropriate Requirements, which set site-specific standards, which give the US EPA the power to enforce standards which would otherwise not be applicable.

3. Solution/recommendation for reform

Schedule 4 of the IGAE explicitly states that an agency of the Commonwealth is responsible for developing National Environment Protection Measures for air quality, water quality and so on. These measures are to be tabled in the Commonwealth Parliament for disallowance,⁵⁵ while legislation is to be passed ensuring that the measures apply in each jurisdiction.⁵⁶ Thus there is scope for the Commonwealth, in consultation with the States and Territories, to develop more stringent, binding measures. The following recommendations for national reform could therefore be undertaken on air pollution drawing on the existing NEPC and NEPM cooperative model, and underpinned by constitutional powers including in relation to regulating corporations and implementing international standards (external affairs).

1. Establish a national Environment Protection Authority (**EPA**) to administer an Australian *Clean Air and Water Act*. The EPA should be established to have three core functions: setting national standards for States and Territories to implement; assessment/concurrence roles for relevant developments such as coal and unconventional gas mining; and compliance and enforcement. The EPA's responsibilities for regulating air, water and land pollution should be specified in the

legislation as enforceable duties. These duties should require that the EPA sets and reviews lists of pollutants and emissions standards, and imposes best practice standards on all licenced facilities to be implemented through State and Territory legislation.

2. In the absence of a new *Clean Air and Water Act*, strengthen implementation of existing standards in the following ways:
 - a. NEPM standards (and the enacting legislation in each State and Territory) should be immediately updated to incorporate an annual average for PM10 of 20µg/m³, to make the current advisory standards for PM2.5 mandatory and to require the standards to not be exceeded, with exceptions made for natural events.
 - b. NEPM should be revised to require polluters to introduce a program of ongoing pollution reduction where all polluters are required to achieve proportional reductions in emissions.
 - c. NEPM, or an equivalent standard, should be introduced for all major emissions.
 - d. Health Impact Assessment (HIA) should be adopted as part of the environmental impact assessment (EIA) process. This should include comprehensive mandatory assessment of cumulative impacts and a requirement to link air quality monitoring and local pollution reduction targets.

3. Ensure consistent regulatory standards through a National Mining Policy Statement

1. Issue/problem

Currently coal and unconventional gas mining are subject to different laws, regulations, standards and policies in each jurisdiction. There is a need for comprehensive national coordination, and the setting of national standards and principles. Precedents exist for addressing natural resource management issues through a national process with state level implementation, but such a process has not yet been applied to the critical issue of coal and unconventional gas mining.

2. Current law and policy

As established by the *Intergovernmental Agreement on the Environment (IGAE)*, the States and Territories are generally responsible for developing and implementing environmental policy to the extent that it does not impinge on matters that fall within the purview of the Commonwealth or other States.⁵⁷ Schedule 2, 'Resource Assessment, Land Use and Approval Processes' confirms that States and local government will have primary responsibility for these matters. While the IGAE supports 'sustainable economic development', this is to be achieved by 'international competitiveness [being] maintained and enhanced in an environmentally sound manner.' Furthermore, the Agreement notes that the four underlying principles of ESD are to guide all levels of government in their development of environmental policy.⁵⁸

As noted, current mining laws are State and Territory based (with the exception of some limited and less direct Commonwealth regulation through environmental laws); and the CSG Harmonisation Framework and MLUF are not comprehensive policies.

3. Useful precedents or case studies

National Forests Policy Statement

The management of Australia's forests is guided by the 1992 National Forest Policy Statement (**NFPS**).⁵⁹ The NFPS is a Commonwealth Government document, and provides a precedent for how natural resource use and management can be coordinated. The NFPS case study provides both useful principles and processes but also illustrates the significant challenges of effectively implementing and enforcing national environmental standards.

The NFPS was signed by the Australian Government and all mainland State and Territory governments in December 1992 and by the Tasmanian Government in April 1995, to address inconsistencies in the levels of State and Territory regulation. In developing the NFPS, Governments were mindful of the important conservation values of Australia's forests, and of the contribution that forest-based activities make to the national economy and rural and regional communities.⁶⁰ This was to be reflected in the Regional Forest Agreements (**RFAs**) which were a key outcome of the NFPS. RFAs are 20 year plans for the conservation and sustainable management of Australia's native forests. The Agreements were intended to provide certainty for forest-based industries, forest-dependent communities and conservation.⁶¹

The NFPS has 11 broad national goals including *"Integrated and coordinated decision making and management: the goals are to reduce fragmentation and duplication in the land use decision-making process between the States and the Commonwealth and improve interaction between forest management agencies in order to achieve agreed and durable land use decisions."*

At the time (1992), some State and Territory Governments had already made significant progress towards nature conservation and wilderness reserves, whereas others had not. To address this issue and to provide a certain level of uniformity the Governments (States and Commonwealth) established a working group of technical experts. Their purpose was to make recommendations on broad criteria on which to base reserve systems to protect the nature conservation values of forests. These working groups comprised of the Australia and New Zealand Environment and Conservation Council (**ANZECC**) and the Australian Forestry Council (**AFC**).⁶²

The NFPS sets out clear circumstances for Commonwealth involvement in assessment processes at a State and Territory level, and how processes will be implemented at a State and Territory level – for example:

*"The State Governments will ensure that, for public native forests, existing or new codes of practice are developed so as to conform to the Australian Forestry Council's national principles. In structure, these codes of practice may take different forms in different States, but they will be effective and either legislatively based or legally enforceable through contractual agreements."*⁶³

The flexibility given to the States and Territories in the above statement is important as it allows for state differences in implementation. However by requiring the codes of practice to reach certain standards, the NFPS was intended to ensure consistent standards are met.

Regarding the state-based implementation of a national process and the relationship between the Commonwealth and State Governments, the NFPS states:

“Completion of comprehensive regional assessments and negotiation of Commonwealth-State regional agreement to form the basis for meeting wood production, nature conservation and other forest allocations. In this respect the Commonwealth will give full faith and credit to accredited State assessment processes, practices and procedures, consistent with the Intergovernmental Agreement on the Environment. ...The Commonwealth will not seek to vary the agreed results of the comprehensive regional assessment processes reflected in the project agreement, except where expressly provided for, such as in defined exceptional or unforeseeable circumstances.”⁶⁴

The intent is therefore to reduce uncertainty about land use decisions by adopting a cooperative decision-making process that results in agreed and durable decisions. Such an approach should lead to a more efficient resolution of land use issues and result in more timely decisions about land use.⁶⁵

The key mechanism of comprehensive regional assessment to develop Regional Forest Agreements is far from perfect. The failure of RFAs in terms of protecting forest biodiversity has been argued by commentators and noted in the Courts.⁶⁶ However, the NFPS case study does provide some useful concepts that could be included in a National Statement on Mining Impacts (discussed below).

The Intergovernmental Agreement on the Reform of Commonwealth-State Financial Relations-Natural Gas Pipelines

There is arguably a precedent for the use of an IGA to galvanise State and Territory uniform legislation on the topic of natural gas. In 1994 COAG agreed to implement complementary legislation so that a uniform national framework applies to access to natural gas transmission pipelines both between and within jurisdictions. An IGA on natural gas pipelines was agreed in November 1997. COAG agreed that the National Third Party Access Code for Natural Gas Pipeline Systems should be given legal effect by a uniform Gas Pipelines Access Law. The agreement indicates that the Gas Pipelines Access Law and the Code are to be set out in schedules to legislation of each State and Territory.⁶⁷

4. Solution/recommendation for reform

The following recommendations for national reform could be undertaken by way of intergovernmental agreement.

1. Develop a National Mining Policy Statement, the implementation of which is to be coordinated through an Intergovernmental Agreement on Coal and Unconventional Gas Mining Impacts.
2. The National Mining Policy Statement should articulate high level principles in relation to protecting food producing land and the environment etc, and establish the cooperative mechanisms by which the principles will be implemented at a State/Territory level. These elements include:
 - Principles
 - Goals (with timeframes)
 - Uniform national standards
 - Uniform State and Territory legislation

- Establishment of technical expert working groups to research, monitor and report on different impacts of coal and unconventional gas mining
- Comprehensive regional assessments
- Process for accreditation of state assessment processes where mandatory national standards are met.
- Ensure consistent regulatory standards through a National Mining Policy Statement

Coal production in Australia is increasing at a rapid rate. Coal exports from Australia are booming with 54% of coal mined in Australia being exported, the majority going to Japan, China, the Republic of Korea, India and Taiwan,⁶⁸ and this is likely to increase in coming years. There are plans for a massive new LNG export industry based on coal seam gas. This is having a major impact on landscapes and communities across Australia, where vast new areas are being opened up for coal and gas extraction. The majority of the economic benefits from these activities are also shipped offshore, with 84% of the mining industry foreign-owned. Australia's key non-mining export oriented industries - including manufacturing, tourism and agriculture - are being damaged as a result of the high dollar and skills shortage related to the mining expansion. There are currently no adequate controls to protect Australia and its landscapes from these impacts.

4. Reform relevant export control laws

1. Issue/problem

Coal production in Australia is increasing at a rapid rate. Coal exports from Australia are booming with 54% of coal mined in Australia being exported, the majority going to Japan, China, the Republic of Korea, India and Taiwan,⁶⁹ and this is likely to increase in coming years. There are plans for a massive new LNG export industry based on coal seam gas. This is having a major impact on landscapes and communities across Australia, where vast new areas are being opened up for coal and gas extraction. The majority of the economic benefits from these activities are also shipped offshore, with 84% of the mining industry foreign-owned. Australia's key non-mining export oriented industries - including manufacturing, tourism and agriculture - are being damaged as a result of the high dollar and skills shortage related to the mining expansion. There are currently no adequate controls to protect Australia and its landscapes from these impacts.

2. Current law

Exports from Australia are regulated by a range of Commonwealth legislation. The *Customs Act 1901* (Cth) Part VI controls the exportation of goods. The *Export Control Act 1982* (Cth) provides that the export of prescribed goods may be prohibited absolutely, to a specified place, or under specific conditions etc. The *Customs (Prohibited Exports) Regulation 1958* (Cth) controls the export of specified goods, by prohibiting export absolutely, or making export subject to the permission of a Minister. Generally, goods to be exported must be declared for export with the Australian Customs Service and an authority to deal with the goods must be granted. However, certain goods, such as wildlife, heritage and hazardous materials, may be subject to additional requirements, which may include Federal Government approval, or total prohibition. There are currently two Commonwealth-administered mineral export controls: rough diamonds; and uranium and related nuclear materials. These Commonwealth-administered mineral export controls are administered by the current Department of Resources, Energy and Tourism.⁷⁰

3. Useful precedents or case studies

Regulation of woodchip exports

Export licenses are required from the Department of Agriculture, Fisheries and Forestry (DAFF) under the *Export Control Act 1982* and regulations for two tonnes or more of: woodchips; wood in the round which is intended to undergo further processing following export; and wood with a cross sectional area of 225 square centimetres or greater which is intended to undergo further processing following export. Under the *Export Control (Hardwood Wood Chips) Regulation 1996*, the export of hardwood woodchips sourced from native forest areas outside RFA regions has been prohibited since 1 April 2000. Export licenses are not required when: wood is sourced from an area covered by a Regional Forest Agreement; or wood is sourced from a plantation in any State or Territory except Queensland.⁷¹

Fraser Island and sand-mining

Fraser Island once had a sand mining industry (to extract minerals from its tracts of black sand) which ceased in 1976 following a federal government inquiry. The inquiry found that the island could not be restored to its former state after mining and Cabinet agreed in November to use its export control power to phase out mining.⁷² In the case of *Murphyores Inc Pty Ltd v Commonwealth* (1976) 136 CLR 1,⁷³ *Murphyores Inc Pty Ltd*, which held leases from the State of Queensland to mine mineral sands on Fraser Island, sought permission from the Minister to export mineral sands. Such authorisation was withheld pending the outcome of the inquiry. *Murphyores* challenged the constitutional validity of the prohibition and sought an injunction to the inquiry, and a declaration that the Minister cannot make a prohibition for environmental purposes. The Court held that the decision by the Commonwealth to deny the export license pending the determination of the environmental impact of sand mining operations on Fraser Island was a valid exercise of the Commonwealth's trade and commerce power under the Constitution. Section 112 of the *Customs Act 1901* (Cth) - "Prohibited Exports" - prohibited the exportation of mineral sands unless authorised by the Minister. Fraser Island is now mostly national park (the Great Sandy National Park) and is one of Australia's eleven World Heritage listed sites (1992).

Customs Amendment (Prohibition of Certain Coal Exports) Bill 2013

In March 2013, a private member's bill was designed to prohibit coal exports from water catchment areas in the Wyong Shire.⁷⁴ There are two clauses in this bill that seek to amend the *Customs Act* for future exports. Under section 112 "Prohibited Exports", the Governor-General can prohibit (by regulation) the exportation of goods from Australia using one of a number of methods. The new amendments propose the following limitations on exports:

Section 112(2AE)

The exportation from Australia of coal mined in:

- (a) *the area defined by the Wyong Shire Council as the "Water Catchment Valleys and District", as at 18 March 2013; and*
- (b) *any other area (however constituted and whether in New South Wales or elsewhere) designated in an instrument made under subsection (2AF); is prohibited.*

Section 112(2AF)

The Minister may, by legislative instrument, designate an area for the purposes of paragraph (2AE)(b).

4. Useful precedents or case studies

Amend the *Customs Act* and associated regulations to prohibit the export of coal or unconventional gas from designated areas that are important to Australia and threatened by extraction for exports. Designated areas should include:

- a) Areas important to existing Australian industries such as agriculture and tourism, including food-producing areas and tourism assets (particularly our 16 National Tourism Landscapes)
- b) Areas important for the protection of Australian natural resources, including water resources, environmentally significant areas, and cultural heritage sites
- c) Areas important for the protection of Australian communities, including buffer zones around all residential dwellings.

5. Protect water resources from impacts of coal and unconventional gas mining

1. Issue/problem

Mining operations typically use large amounts of water. While water that seeps into open cut coal mines from adjacent aquifers is sometimes recycled and used on site for operational needs such as dust suppression, any deficit in water supply needs to be supplemented by other means. This may require pumping large quantities of water from groundwater or surface water, as the case may be. In some States and Territories, mining companies are required to hold licences in order to extract water from aquifers and rivers.⁷⁵ Nevertheless, statutory exceptions may apply to licensed mines, exacerbating the impacts of these operations on aquifers, interconnected surface water sources and groundwater-dependent ecosystems, particularly during periods of drought.⁷⁶

The hydrological impacts caused by subsidence (i.e. the sinking of the Earth's surface) that are associated with longwall coal mining can be devastating and far-reaching. A report published by the NSW Scientific Committee (established by the *Threatened Species Conservation Act 1995*) highlights some of the key problems. These include (but are not limited to): cracking of valley floors and creeklines which in turn impacts surface and groundwater hydrology; cracking and water loss causing permanent changes to riparian community structure and composition; contamination of water by acid drainage; changes to flood behavior; increased rates of erosion; and deterioration of water quality due to a reduction in dissolved oxygen and increased salinity, iron oxides, manganese and electrical conductivity.⁷⁷ Water from mines can also contain elevated levels of suspended solids and heavy metals such as copper, cobalt and zinc.

CSG exploration and production is associated with particular risks to water resources. Specifically, the National Water Commission has identified five areas of potential risk to sustainable water management:

1. Extraction of large volumes of water, which will impact on connected groundwater and surface water systems.
2. Impacts on other water users and the environment due to depressurisation of the coal seam. Impacts include:
 - changes in pressures of adjacent aquifers, and resulting changes in water availability;
 - reductions in surface water flows in connected systems;

- land subsidence over large areas, affecting surface water systems; ecosystems, and agricultural lands.
3. Production of large volumes of treated waste water, if released to surface water systems, could alter natural flow patterns and significantly affect water quality, river and wetland health. There is an associated risk that, if water is overly treated, 'clean water' pollution of naturally turbid systems may occur.
 4. Hydraulic fracturing has the potential to induce connection and cross-contamination between aquifers, with impacts on groundwater quality.
 5. The reinjection of treated waste water into other aquifers has the potential to change the beneficial use characteristics of those aquifers.⁷⁸

More recent research from the United States of America suggests that such reinjection of treated waste water may also be responsible for increased seismic activity⁷⁹. Although Australia is geologically stable relative to many of the locations studied, this finding highlights that the expanding CSG and unconventional gas industries are likely to experience many unforeseen impacts on the environment that require a legislative framework that is able to respond quickly to emerging threats.

Underground Coal Gasification (UCG) is known to cause subsidence which increases the risk of chemical and gas leakage into the environment.⁸⁰ Other contaminants produced by UCG include benzene, toluene, ethylbenzene, xylenes, phenols, and polycyclic aromatic hydrocarbons. The *Independent Scientific Panel Report on Underground Coal Gasification Pilot Trials* identified that there is a risk that these products make leak into the surrounding environment due to "variations and deviations in temperature, pressure, groundwater flow and gas and vapour movement into and out of the UCG cavity." As neither of the pilot trials examined in the report successfully decommissioned a UCG site during the study, the Independent Scientific Panel recommended that no commercial operations should be permitted until successful decommissioning has been demonstrated.

2. Current law

Water use, water quality and water pollution associated with coal mining and unconventional gas development are generally regulated by the States and Territories under water management, pollution and planning legislation.⁸¹ However, some Commonwealth laws and policies relate to water resources and are therefore relevant. These are summarised briefly below.

EPBC Act

Until recently, the EPBC Act did not have a 'water trigger' as such, but could be applicable to water impacts indirectly where a coal mine or unconventional gas development is likely to have a significant impact on, for example, a Ramsar wetland, or an aquatic or groundwater dependent listed species or community. Two recent reforms have clearly given the EPBC Act a clearer role in relation to assessing the impacts of mining and CSG on water resources.

First, the *Environment Protection and Biodiversity Conservation Amendment Bill 2013 (Water Trigger Bill)* was recently passed, adding a ninth matter of NES to the EPBC Act. The ninth matter is a 'water trigger' that will result in large coal mining developments and CSG developments that are likely to have a significant impact on water resources being declared controlled actions. The definition of 'water resources' in the EPBC Act is the same as the definition in the *Water Act 2007 (Cth)*.⁸² As such, it includes not only surface water, wetlands and groundwater, but the organisms and ecosystems that form part of these bodies of water.

However, the 'water trigger' as currently enacted, excludes other forms of unconventional gas mining, including shale gas and tight gas, and also appears to exclude unconventional coal mining, such as underground coal gasification. This creates an inconsistent regulatory environment for unconventional gas mining, and leaves activities that are potentially very damaging to water resources outside the operation of the Act.

Second, recent changes to the EPBC Act provided for the creation of an Independent Expert Scientific Committee (**IESC**),⁸³ the function of which is to provide the Minister with expert scientific advice on development proposals and bioregional assessments being considered under the EPBC Act that may have a significant impact on water resources. The IESC will also provide a range of expert scientific assistance on research on leading practice standards for CSG and mining.⁸⁴

The first few projects approved since the amending Bill was passed indicate a willingness to follow the IESC's recommendations on some projects, although conditions for other projects have fallen well short of those recommendations. The Minister, for example, fell short when he approved a final mine void and pit lake for the Maules Creek Coal Project despite the IESC stating that backfilling of mining voids is environmental best practice. On the other hand, the Minister's approval for the AGL Gloucester Gas Project lists 10 conditions to protect water resources that were largely informed by the IESC advice. These include a requirement to provide the Minister with details of the hydraulic fracturing agents or other reinjected fluids to be used during the operation, as well as a 2 megalitre-per-day limit on groundwater extraction.⁸⁵ It remains to be seen, first, whether companies will challenge such conditions and, second, whether a court would view the Minister's powers under the EPBC Act as sufficient to impose such conditions.

Water Act 2007 and Basin Plan 2011

The *Water Act 2007* (**Water Act**) is directed toward cooperative management of water resources in the Murray-Darling Basin (**Basin**). The instrument charged with achieving this object is the Basin Plan, which after much debate was made law in November 2011.⁸⁶ The purpose of the Basin Plan includes restoring an environmentally sustainable level of take (**ESLT**) in the Basin. This will in part be achieved by developing 'water resource plans' (**WRPs**) which allocate water amongst users in designated WRP areas. Users include irrigators, towns, mines and the environment. While the equivalent of WRPs already exist in most relevant jurisdictions, these will have to be accredited in accordance with the requirements of the Basin Plan by 2019.⁸⁷ The objects of the Basin Plan are also to be achieved by establishing tradeable water rights,⁸⁸ though we note that in practice this will constitute an expansion of existing intrastate, and to a limited extent, interstate, trading of water access licences.⁸⁹ Mining companies wishing to extract water will be required to purchase water access licences from the water trading market. The allocation of water to coal and unconventional gas developments can have implications for other land uses. In their Guide to the Basin Plan, the Murray-Darling Basin Authority noted that:

*Where water systems are approaching, or are at, full allocation, current and future mining developments could, if not adequately managed and regulated, affect surface-water or groundwater systems at a regional scale.*⁹⁰

The Basin Plan sets water quality and salinity targets that were prepared having regard to the National Water Quality Management Strategy⁹¹ (discussed below). However, these targets are not mandatory⁹² and to that extent are unenforceable under Water Act.

3. Useful policy precedents or case studies

Intergovernmental Agreement on a National Water Initiative

Between 2004 and 2006, the Commonwealth, States and Territories signed the Intergovernmental Agreement on a National Water Initiative (**NWI**), the first significant, coordinated policy response to water management issues in Australia. Broadly speaking, the object of the NWI is to create a 'nationally-compatible, market, regulatory and planning based system of managing surface and groundwater resources for rural and urban use...'.⁹³ This is to be achieved through ten objectives, namely:

- i. the creation of nationally-compatible water access entitlements;
- ii. statutory-based water planning;
- iii. statutory provisions for environmental and other public benefit outcomes, and improved environmental management practices;
- iv. complete return of all overallocated systems to ESLT;
- v. increasingly open water markets;
- vi. clarifying risk to consumptive users arising from future changes in water availability;
- vii. developing water accounting systems;
- viii. developing policy which facilitates water use efficiency;
- ix. addressing future adjustment issues that may impact on water users and communities; and
- x. recognition of connectivity between surface and groundwater and managing connected systems as a single resource.⁹⁴

Implementation of these objectives is provided for in over 70 actions, each of which is attached to a specific timeline.⁹⁵

The NWI further provided for the creation of the National Water Commission (**NWC**), an independent Commonwealth statutory body charged with advising COAG on a range of matters including accreditation of State and Territory implementation plans.⁹⁶

The NWI explicitly refers to the mining and petroleum sectors in the section entitled 'Water Access Entitlements', noting that the activities of these industries may, in certain circumstances, reach beyond the scope of the NWI:

The Parties agree that there may be special circumstances facing the minerals and petroleum sectors that will need to be addressed by policies and measures beyond the scope of this Agreement. In this context, the Parties note that specific project proposals will be assessed according to environmental, economic and social considerations, and that factors specific to resource development projects, such as isolation, relatively short project duration, water quality issues, and obligations to remediate and offset impacts, may require specific management arrangements outside the scope of this Agreement.⁹⁷

The NWC acknowledges developments in most jurisdictions to regulate the mining sector's impact on water resources, but notes that the sector has not been fully integrated into NWI-consistent planning and management frameworks. Exemptions also exist in some jurisdictions. For example, in the Northern Territory, mining 'remains outside the water planning and entitlement frameworks', while in Western Australia 'major mining developments can still be facilitated through arrangements that override water regulation.'

Furthermore and as previously noted, the NWI does indicate that there may be ‘special circumstances’ which require the minerals and petroleum sectors to be managed in accordance with specific arrangements that lie beyond the NWI. However, there is concern that ‘this exemption has been applied as the norm, not the exception.’⁹⁸

National Water Quality Management Strategy

The National Water Quality Management Strategy (**NWQMS**) was developed by the governments of Australia and New Zealand in cooperation with States and Territories. Divided into three core areas – policy, process and guidelines – its broad purpose is to protect water resources while supporting the environment, community and industry.⁹⁹ The NWQMS does not include mandatory targets. As such, it is up to each State and Territory government to determine if and how it will incorporate the Strategy into its policies and legislation.

The NWQMS comprises a process or implementation document, and 20 separate water quality guidelines applicable to different management categories, such as drinking water and groundwater. It is organised around the principle of protecting ‘environmental values’ (**EVs**), which are essentially defined as beneficial uses.¹⁰⁰ EVs are identified in the key guideline, namely the ‘Australian and New Zealand Quality Guidelines for Fresh and Marine Water Quality’ (**ANZECC Guidelines**) to include (amongst others): Protection of Aquatic Ecosystems; Recreational Water Quality and Aesthetics; and Raw Water for Drinking Water Supply.¹⁰¹

Neither the ANZECC Guidelines for Aquatic Ecosystems nor the Groundwater Guidelines are mandatory. The ANZECC Guidelines for Aquatic Ecosystems indicate that this is ‘because there is significant uncertainty associated with the derivation and application of water quality guidelines.’ For example, ‘there is uncertainty regarding the behaviour of contaminants in the field.’ Accordingly, ‘users should be aware of this uncertainty when determining if an environmental value has been met or not.’¹⁰² Similarly, the object of the Groundwater Guidelines is to provide a ‘framework’ for groundwater management across Australia, as opposed to impose obligatory standards. Nevertheless, based on our experience, enforceability is a crucial component of any effective regulatory framework. Furthermore, in a 2011 review of the NWQMS (**Review**), it was reported that many of the technical guidelines (which would include the ANZECC Guidelines for Aquatic Ecosystems and Groundwater Guidelines) were not current and ‘not widely used by jurisdictions.’¹⁰³ The Review found that the absence of performance metrics and reporting processes to measure the ongoing effectiveness of the NWQMS was problematic,¹⁰⁴ and noted,

*NWQMS does not attempt to set any national water quality management performance targets or standards. Instead, the NWQMS is based on the incorporation of ESD principles by all jurisdictions into water quality management.*¹⁰⁵

This is of concern for two reasons. First, targets and standards can provide environmental management tools with ‘teeth’, particularly if performance indicators are developed to measure progress toward achieving specific goals, and are capable of being adapted to incorporate best-available science (in respect of climate change, for example).¹⁰⁶ Second, State and Territory jurisdictions often fail to adequately incorporate the principles of ESD into their environment and planning legislation.

4. Solution/recommendation for reform

1. Amend the water trigger in the EPBC Act to cover 'other forms of unconventional gas' including shale and tight gas development, and unconventional coal developments such as underground coal gasification.
2. Review the application of the ANZECC Guidelines, with a view to establishing specific national standards for coal and unconventional gas developments. These standards will provide certainty to industry and the community but should allow the ability to adjust standards to meet the needs of unusual environments, for example naturally saline waterways.
3. As per the Recommendation in part 2, establish a national EPA to administer a national *Clean Air and Water Act*.
4. No further UCG projects should be approved under EPBC Act MNES requirements until successful decommissioning of existing projects has been demonstrated.

6. Improve regulation of chemicals used in coal and unconventional gas mining

1. Issue/problem

Hydraulic fracturing (fracking) involves injecting fluids under high pressure into coal seams in order to fracture the seams and release the methane contained therein. Fracking fluid generally contains water, a proppant such as sand or ceramic material which prevent the fractures from closing, and chemicals.¹⁰⁷ According to the CSIRO, fracking fluid is 97 to 99 per cent water and sand, with chemicals making up the remaining one to three per cent.¹⁰⁸ However, given the volumes of fluid injected into a single well head, even one to three per cent is in real terms a significant quantity. For example, an environmental risk assessment (**Golder Report**) of fracking associated with the expansion of CSG fields operated by Santos in the Bowen and Surat Basins determined that approximately 18,350 kg of chemicals were injected into each well, which amounted to 2,621 kg for each of seven coal seams intercepted.¹⁰⁹ In addition to the aggregate quantities of chemicals that are injected into each well head, there is concern about the nature of these chemicals and their potential impacts on human health and the environment. This issue has been complicated by the absence of public disclosure legislation in Australian jurisdictions, with many companies declaring the specific mix of chemicals used in their operations to be 'commercial-in-confidence'. While NSW has introduced a code of practice requiring all management plans to identify chemicals 'injected as part of the fracture stimulation process', this document has no statutory basis,¹¹⁰ and only applies to new and renewed licences.¹¹¹

The vast majority of chemicals used in fracking have not been tested by Australia's chemical regulator, the National Industrial Chemical Notification and Assessment Scheme (**NICNAS**) (discussed below). In fact, out of 23 chemicals *known* to be used in fracking fluids in Australia, only two have been assessed by NICNAS, and neither for their use in fracking.¹¹² While these 23 chemicals have material data safety sheets (**MSDSs**),¹¹³ they are 'typically vague on the descriptions of both toxicological and ecotoxicological effects'¹¹⁴ and at least nine are known to have adverse impacts on human health and/or the environment. For example, the CSIRO notes that cyclohexylamine may be used in fracking fluid. Cyclohexylamine¹¹⁵ is listed as an 'extremely hazardous substance' under section 302 of the

Emergency Planning and Community Right to Know Act (USA).¹¹⁶ While it is presently difficult to be certain of every chemical used in every fracking fluid formulation in Australia, a report by a US Standing Committee found that approximately 750 different chemicals were used in fracking compounds in the United States.¹¹⁷

The lack of effective, enforceable law to protect the environment from chemicals is arguably a systemic problem in Australia. In a report assessing chemical regulation in Australia, the Productivity Commission found that ‘current regulatory mechanisms were ineffective for managing the risks of industrial chemicals to the environment,’ and that ‘this gap represented the most significant failing in Australia’s chemicals and plastics regulatory regime.’¹¹⁸ In particular, the current NICNAS system fails to adequately regulate chemicals when they are adapted for a new purpose, for example for use in fracking fluid. NICNAS is currently undertaking a National Assessment of CSG chemicals, in which data on chemicals used will be collected via a voluntary survey.¹¹⁹ Options for reform of NICNAS are also currently under consideration.¹²⁰

2. Current law

‘Regulation’ rarely amounts to prohibition; in most instances, legislation and policy specify when, how, and how much of a chemical can be used, transported, discharged into the environment, or stored. Some chemicals are prohibited or severely restricted by the Commonwealth pursuant to obligations contained in international treaties, such as the Stockholm Convention on Persistent Organic Pollutants, but these controls usually apply to relatively short lists of substances known to harm humans and/or the environment. Other chemicals – such as BTEX – are banned or restricted in specific States or Territories for certain uses. While BTEX (benzene, toluene, ethylbenzene and xylene) have been banned from use in fracking fluids in NSW since 2012¹²¹ and have been restricted in QLD since 2011,¹²² the ban in NSW has not been enforced under legislation.

Industrial Chemicals (Notification and Assessment) Act 1989

The *Industrial Chemicals (Notification and Assessment) Act 1989* (**NICNAS Act**) provides for the creation of NICNAS.¹²³ NICNAS assesses all industrial chemicals new to Australia, although some exemptions apply,¹²⁴ and assesses those chemicals already in use on a priority basis. All new and existing chemicals – whether assessed or not – are listed on the Australian Inventory of Chemical Substances (**AICS**), though newly assessed chemicals may not be added for up to five years.¹²⁵ Information on the assessment process is not publicly available until the chemical has been added to AICS. Any chemical included in the AICS may be imported into or used in Australia without obtaining an ‘assessment certificate’ (**certificate**), unless it is subject to conditions included in the AICS.¹²⁶ As NICNAS did not commence until 1990, most of the 40,000 chemicals on the AICS have never been formally assessed.¹²⁷

The AICS comprises a confidential and non-confidential section. Both sections must include information concerning the approved particulars of each listed chemical, including any conditions of use that apply to the chemical,¹²⁸ though only the non-confidential section is publicly available.¹²⁹ In deciding whether a chemical may be listed in the confidential section, the Director of the National Industrial Chemicals Notification and Assessment Scheme (**Director**) must determine whether the commercial prejudice alleged by the applicant outweighs the public interest accessing the information.¹³⁰

Under the Act, each chemical assessed must obtain an assessment certificate. The assessment certificate must contain a range of information including: the name of the applicant; particulars of the chemical; a statement that the applicant has complied with certain requirements under the Act; a statement that the chemical has been assessed under

the Act; and a statement that a notice has or will be published in the Chemical Gazette regarding the public report.¹³¹ The NICNAS Act provides for certain chemicals to be declared 'priority existing chemicals' by the Minister. Such a declaration may be made where the Director has reasonable grounds for believing that the manufacturing, use, storage, handling or disposal of the chemical does or may have an adverse impact on human health or the environment.¹³² However, assessment of such chemicals is not mandatory unless a third party requests that it be undertaken within 28 days of a Ministerial declaration.¹³³ Furthermore, if the Director has not caused the chemical to be assessed within 12 months of the declaration, the Director must remove the particulars of the chemical from the inventory.¹³⁴ The Minister may prohibit use of the chemical while it is classed as a priority existing chemical where they have reason to believe that an activity involving the existing chemical could adversely affect human health or the environment.¹³⁵

Where an assessment is to be undertaken, certain matters must be taken into account, with these matters varying depending on whether it is a preliminary or full assessment. While both assessments must consider whether the chemical has the 'intrinsic capacity to cause' any adverse impacts on the environment or humans, only a full assessment must consider 'any risk to the environment arising from the use of the chemical or from the discharge of waste products resulting from [its] manufacture'.¹³⁶ The Director is not obliged to impose conditions of use on a chemical, even after an assessment report has indicated that it is likely to be harmful to the environment and human health.¹³⁷ Publication of the final assessment report revokes the original declaration, which means the chemical is no longer listed as a priority existing chemical.¹³⁸

Finally, the NICNAS Act provides for year-long registration of individuals who introduce 'relevant industrial chemicals' during the year. Relevant industrial chemicals are defined by way of exclusion and broadly speaking comprise all non-naturally occurring chemicals, as well as chemicals that are not the product of a chemical reaction.¹³⁹ Specifically, it is a strict liability offence to introduce chemicals without applying for registration.¹⁴⁰

National Harmonised Regulatory Framework for Natural Gas from Coal Seams

As noted elsewhere in this report, the CSG Framework outlines 18 leading practices across four areas that may be adopted by State Governments. Although the Framework is unenforceable, it does include leading practices 14 – 18 concerning chemicals:¹⁴¹

- *Handle, manage, store and transport chemicals in accordance with Australian legislation, codes and standards.*
- *Minimise chemical use and use environmentally benign alternatives.*
- *Minimise the time between cessation of hydraulic fracturing and flow back, and maximise the rate of recovery of fracturing fluids.*
- *Increase transparency in chemical assessment processes and require full disclosure of chemicals by the operator in the production of natural gas from coals seams.*
- *Undertake assessments of the combined effects of chemical mixtures, in line with Australian legislation and internationally accepted testing methodologies.*

3. Useful precedents or case studies

National Framework for Chemicals Environmental Management

The National Framework for Chemicals Environmental Management (**NFCEM**) was endorsed by the Environment Protection and Heritage Council, a COAG standing council that was superseded by the Standing Council on Environment and Water in 2011. The NFCEM comprises a Ministerial Agreement on Principles for Better Environmental Management of

Chemicals (**Ministerial Agreement**), and a Chemicals Action Plan for the Environment (**Action Plan**).

The Ministerial Agreement endorses ‘a national approach for better managing the environmental impacts of chemicals,’ which is to consist of four key actions: improved environmental risk assessment of chemicals; improved consistency and quality of environmental chemical regulation; improved understanding of impacts and feeding this information back to assessment agencies (such as NICNAS); and developing an inclusive and transparent process for prioritising action.¹⁴² The Ministerial Agreement also outlines eight principles to guide environmental agencies in their application of the Agreement. These include: using best practice approaches when undertaking environmental risk assessments of chemicals and make the methodology transparent to the community and industry; and raising industry and community confidence in the effective and efficient environmental management of chemicals.¹⁴³ The Action Plan establishes specific actions for key areas, which are: communication and evaluation; prioritising action; feedback of information; environmental controls; and environmental risk assessment. Like all COAG initiatives, the Ministerial Agreement is more aspirational, than strictly prescriptive, in nature.

US disclosure laws

We note that the Obama administration announced in May 2013 that it would require companies drilling for oil or natural gas on Federal and Indian land to disclose chemicals used in fracking operations, though the proposed law has drawn criticism for failing to require complete disclosure or vetting of disclosed chemicals.¹⁴⁴ Several American States have also introduced disclosure laws which require either complete or partial pre-fracking disclosure of all chemicals used. As of 2012, these were: Montana; Indianapolis; West Virginia; Wyoming; and Arkansas.¹⁴⁵ However, these laws are in certain instances undermined by exemption provisions which enable companies to request that fracturing chemicals remain commercial-in-confidence.¹⁴⁶

4. Solution/recommendation for reform

1. Amend the NICNAS Act in the following ways:
 - a. Require NICNAS to undertake a full hazard assessment for all chemicals used in unconventional gas and coal activities, including their impacts on human health and the environment. The assessment should be overseen by an advisory body consisting of industry and civil society representatives.
 - b. Require compulsory disclosure of chemical ingredients of all fracking and drilling products used by constitutional corporations in Australia.
 - c. Require the Director to prohibit all fracking and drilling chemicals deemed harmful to human health and the environment.

7. Improve biodiversity protections

1. Issue/problem

Mining operations can impact on biodiversity in a number of ways. The NSW Scientific Committee has listed the alteration of habitat following subsidence due to longwall mining as a key threatening process¹⁴⁷ because of hydrological impacts on upland swamps, and the

threatened species and ecological communities they support. Clearing of vegetation for mining operations can result in the loss of native vegetation, including listed ecological communities, and loss of habitat for listed threatened species. The habitat loss caused by land clearing on sites for mining activities is followed by a range of ongoing impacts as operations proceed, including ancillary clearing for subsequent approval variations and modifications.¹⁴⁸ Biodiversity offsetting is often undertaken by mining industries with variable results.

2. Current law

EPBC Act

The central piece of Commonwealth environmental legislation, the EPBC Act, regulates the impacts of 'actions' on matters of NES. As noted throughout this report, there are currently nine matters of NES:

- World Heritage;
- National Heritage;
- Wetlands of National Importance;
- Listed threatened species and communities;
- Listed Migratory species;
- Protection of the environment from nuclear actions;
- Commonwealth marine area;
- Great Barrier Reef Marine Park;¹⁴⁹ and
- Large coal mining and CSG developments likely to have a significant impact on water resources.

Under the EPBC Act, it is an offence to take an action that is likely to have a significant impact on a matter of NES without an 'environmental approval'. An 'action' is defined to include a project, development, undertaking, activity or series of events, or any alteration to these actions.¹⁵⁰ An environmental approval may be issued by the Commonwealth Minister for the Environment (**Minister**).¹⁵¹ If an action is likely to have a significant impact on one of these matters, it is classified as a 'controlled action.' The term 'significant impact' is not defined in the EPBC Act, however the Federal Court has interpreted this term to mean 'an impact that is important, notable or of consequence having regard to its context or intensity.'¹⁵² There are also brief 'Significant Impact Guidelines' intended to clarify when a project might have a significant impact on a matter of NES.¹⁵³ The Minister is responsible for determining the environmental impact assessment method for the controlled action. These methods include: delegating assessment to the State or Territory, to be undertaken in accordance with an assessment process provided for in State or Territory legislation (**accredited assessment process**); or the Commonwealth undertaking the assessment on the basis of an environmental impact assessment (**EIS**), a public environment report (**PER**) or through an inquiry.¹⁵⁴ In determining whether or not to approve a controlled action, the Minister must take into account a range of factors including (but not limited to): social and economic matters; principles of ESD; the EIS; and the proponent's environmental history; and the Minister must act consistently with relevant international Conventions.

The Act does have some limitations including that:

- the Act is only triggered in relation to specific matters of NES.
- controlled actions are almost always approved under the EPBC Act. Since coming into force in 1999, 4,000 actions have been referred under the Act for Commonwealth

consideration. Of the 3,744 referrals that were deemed to be ‘controlled actions’, only seven have been refused on the basis that they would have an unacceptable impact on a matter of NES.¹⁵⁵ The Act does not establish criteria for refusal.

- the Minister has complete discretion to determine what assessment guideline provisions will apply to a controlled action, regardless of the nature and scale of development.¹⁵⁶ For example, there is no statutory requirement that detailed hydrological modelling be undertaken by a proponent for a mining development as part of the assessment process.
- ESD is just one of several factors that must be considered by the Minister when deciding whether to approve or refuse the application.¹⁵⁷ That is, there is no overarching requirement to consider ESD above and beyond these other factors.
- the Act allows for bilateral assessment and approval provisions, which have in the past endorsed state assessment processes that do not meet Commonwealth standards.¹⁵⁸ Accreditation of State assessment and approval processes under the EPBC Act¹⁵⁹ is a contentious issue, with debate persisting as to whether these processes are robust enough to properly address matters of NES and comply with Australia’s international environmental law obligations.¹⁶⁰
- only one trigger, the ‘water trigger’, provides for consideration of cumulative impacts when determining if a proposed development will have a ‘significant impact’ on a matter of NES.¹⁶¹ Otherwise, the Act focuses on site-by-site assessment and approval.
- the Act lacks merits appeal and open standing provisions (third party standing is qualified), both of which undermine enforcement of its provisions in the public interest.

Environment Protection Biodiversity Conservation Amendment Bill 2013

The ninth matter of NES (the ‘water trigger’) will result in large coal mining developments and CSG developments likely to have a significant impact on water resources being declared controlled actions. Consequently, the Bill will improve regulation of coal mining and CSG developments likely to have a significant impact on aquatic biodiversity, subject to the existing limitations of the Act.

3. Useful precedents or case studies

The following case demonstrates issues associated with the failings of State laws to protect biodiversity from the impacts of mining. We note that since the judgement, the NSW has proposed a new instrument which would make ‘the economic significance of the resource’ an overriding consideration.¹⁶²

Bulga Milbrodale Progress Association Inc. v Warkworth Mining Limited & Ors

Warkworth Mining Limited was seeking to substantially expand its existing open cut mining operations in order to extract an extra 18 million tonnes of coal per year. The expansion would bring the mine closer to Bulga village and would have allowed the company to mine part of a biodiversity offset that was required to be protected as a condition of the existing open cut approval granted in 2003. The biodiversity offset provides habitat for threatened flora and fauna, and acts as a buffer between the village of Bulga and the existing open cut mine. The Bulga Milbrodale Progress Association Inc challenged the expansion and the Court concluded that the expansion would have significant and unacceptable impacts on

biological diversity, particularly on endangered ecological communities, as well as unacceptable noise and social impacts. The Court considered that the proposed conditions of approval were inadequate and would not allow the project to achieve satisfactory levels of impact on the environment, including the residents and community of Bulga. The Court found that these matters outweighed the substantial economic benefits and positive social impacts of the project on the region, and that the mine extension should not go ahead. The subsequent appeal by Warkworth and the cross appeal by the Minister for Planning and Infrastructure have alleged that the Chief Judge made errors of law in finding that the expansion to the mine should be refused.

4. Solution/recommendation for reform

1. Amend the EPBC Act in the following ways:

- a. The Act should include clear criteria for refusal of coal and unconventional gas projects.
- b. Apply a sunset clause of 2 years on developing mines after they have been deemed a controlled action to ensure that approvals are consistent with the latest knowledge on matters of NES.
- c. Amend Part 9 of the EPBC Act to incorporate a transparent assessment process that takes into account the cumulative impacts of coal and unconventional gas development in an area. This should include a requirement to undertake bioregional assessments of the cumulative impacts of coal and unconventional gas developments.
- d. Amend Division 6 of Part 8 of the EPBC Act to require the Minister to provide proponents of coal mining development or unconventional gas development with tailored guidelines. A schedule should be added to the regulations outlining guidelines that are specifically tailored to coal mining development and unconventional gas development. These guidelines should include a requirement to undertake detailed pre-assessment studies relevant to the matter of NES in accordance with international standards of best practice.
- e. Amend the EPBC Act to provide for exclusion zones around sensitive environmental areas, including critical habitat. These would apply to all forms of development, including coal mining and unconventional gas development.
- f. Prohibit mining of areas offset for biodiversity under previous approvals.
- g. Amend the EPBC Act to provide for a schedule of mandatory conditions of consent to be imposed on approved controlled actions (in addition to other conditions of consent), where the controlled action is a coal mining development or unconventional gas development. The Act is to stipulate that mandatory conditions are to be development in consultation with appropriately qualified experts.
- h. Amend the EPBC Act to include broad open standing provisions and provide for merits-based appeals of decisions made under the Act.

- i. Delete approval bilateral agreements to ensure the Commonwealth retains an approval role for coal and unconventional gas developments

8. Protect world heritage areas from impacts of coal and unconventional gas mining

1. Issue/problem

Coal and unconventional gas mining (and associated infrastructure and transport) can have significant impacts on world heritage areas in Australia, such as the Great Barrier Reef Marine Park (GBRMP).

2. Current law

EPBC Act

Under the EPBC Act, the Commonwealth is responsible for ensuring Australia's international obligations under the World Heritage Convention and other relevant environmental treaties are met.¹⁶³ Specifically, projects that are likely to have a significant impact on the 'world heritage values' of declared World Heritage property are 'controlled actions' under the Act.¹⁶⁴ The Minister is required to take into account both generic and specific matters during the assessment process. In the first instance, when deciding whether to approve or refuse a development (or when attaching conditions to an approval), the Minister must consider a range of matters including, but not limited to: ESD; any relevant assessment report; social and economic factors; and the applicant's environmental history.¹⁶⁵ More specifically, in determining an application (and when attaching conditions to an approval), the Minister must not act inconsistently with Australia's obligations under the World Heritage Convention; the Australian World Heritage Management Principles; and a plan that has been prepared for the management of a World Heritage property under the EPBC Act.¹⁶⁶ Australia has 19 properties declared on the World Heritage List.¹⁶⁷

There are a number of limitations of the current laws in terms of adequately protecting world heritage areas from the impacts of coal and unconventional gas mining. These include that:

- The generic and specific assessment provisions do not provide for the consideration of cumulative impacts. This is a significant regulatory gap, particularly in respect of port and other development in and adjacent to the GBRMP. We note that a strategic environmental assessment of the GBR is underway but has not been completed.
- Only the 'world heritage values' of the 'World Heritage property' attract protection under the EPBC Act. As one commentator has noted, '[t]he property does not stand by itself as worthy of "protection".'¹⁶⁸ 'World Heritage values' is arguably a more nebulous concept which does not translate well into concrete protection measures, particularly when protecting the physical site is subordinate to maintaining the 'values' of that site.

It has been argued that the EPBC Act may not properly implement the World Heritage Convention. Specifically,

*The Commonwealth is bound to ensure any ministerial approval is consistent with the World Heritage Convention. The EPBCA can only be in conformity with the World Heritage Convention if ministerial approval is granted on the basis that the whole area or property is protected rather than the specific “World Heritage value”. It follows that, to the extent to which the EPBCA allows activities on a World Heritage property which may adversely impact on the property, and which cannot be for the protection, conservation or presentation of the property, the Act is in contravention of Australia’s obligations under the Convention.*¹⁶⁹

Specifically, the EPBC Act does not guarantee protection of the physical site, only its values, while Articles 1 and 2, while the ‘Operational Guidelines for the Implementation of the World Heritage Convention’ (**Operational Guidelines**) require parties to the Convention to ‘protect, present and conserve the whole or complete World Heritage property’.¹⁷⁰ Furthermore, the World Heritage Convention conceives of World Heritage properties as properties possessing Outstanding Universal Value (OUV) which in turn merit a particularly high level of protection.¹⁷¹

3. Useful precedents or case studies

Impacts of mining development on the Great Barrier Reef

Most coal deposits in QLD are spread across six major basins,¹⁷² with nine new ‘mega’ mines in the Galilee Basin either proposed,¹⁷³ under assessment¹⁷⁴ or approved.¹⁷⁵ Exporting coal requires specific infrastructure. Therefore in addition to hundreds of kilometres of rail links, airfields and accommodation for employees, the new ‘mega mines’ in the Galilee Basin will require additional ports to deliver coal to overseas clients. There are currently 12 ports within the Great Barrier Reef (**GBR**) World Heritage area and GBR Region; two of these are located within the GBRMP.¹⁷⁶ The 12 ports are managed by four port authorities, all QLD Government-owned corporations.¹⁷⁷ The QLD Resources Council has indicated that the current national port capacity of 242 million tonnes will need to triple to approximately 787 million tonnes by 2020 if Australia is to support the current increase in coal production.¹⁷⁸

According to the Great Barrier Reef Marine Park Authority (**GBRMPA**), four proposals to either construct new, or expand existing, coal export facilities (including ports) are presently under assessment. These ports are partly located within the GBRMP, as well as within the World Heritage area and GBR Region. Proposed new ports are located at Port Alma¹⁷⁹ and Abbot Point,¹⁸⁰ with proposals to expand existing ports at Abbot Point and Dudgeon Point. A proposal to dredge an additional channel in Port Gladstone, home of the world’s fourth largest coal export terminal,¹⁸¹ is also being assessed.¹⁸² Consequently, they will involve extensive dredging within the GBRWHA, as well as increased shipping activity. Additional port projects have also been proposed within the GBR World Heritage area and GBR Region. Specifically, a proposal to construct a new coal export facility on Balaclava Island was being assessed by the QLD Government before being withdrawn in May 2013.¹⁸³ However, it is possible that the proposal will be resurrected at some point in the future.

The World Heritage Committee and the International Union for the Conservation of Nature (**IUCN**) expressed concern regarding these and other coastal developments, noting in the Mission Report that:

[c]onsidering the rapid increase of coastal developments, including ports infrastructure, and the fact that circa 35 new development proposals are awaiting determination by 2013, including in highly sensitive or already pressured areas, the mission concludes that this is of high concern to the conservation of the OUV for which the property is inscribed on the World

Heritage List. The property further lacks an overall plan for the future sustainable development of the reef that will protect its OUV and ensure its ecological integrity while simultaneously achieving sustainable economic and social goals. (Our emphasis). ...

The mission further concluded that the practice related to port development within and in areas adjacent to the property is not carried out consistently with the highest international standards of practice commensurate with status of an iconic World Heritage property....

The mission noted that the boundaries of the property are defined in relation to low water mark, but that reclamation has taken place in some port areas within the property. The mission noted that the defined boundary of the property clearly remains the low water mark at the date of inscription of the property on the World Heritage List, and considers as part of the assessment of development since inscription, more information is required on the specific extent of reclamation that has taken place within the property. It also noted that continued reclamation is a specific concern in relation to integrity.¹⁸⁴

The GBRMPA outlines a long list of impacts to the marine environment associated with the operation of port facilities. These include, but are not limited to: removal of existing habitat, such as seagrass; seabed disturbance; cumulative loss of species; degradation of water quality; increased underwater noise; injury of mortality to marine species, including threatened species; and increase in carbon dioxide emissions.¹⁸⁵

The Mission Report further noted that ‘an essential problem arising from the current project-by-project approval process for coastal development (including ports) is the lack of consideration for their cumulative, combined and consequential impacts.’¹⁸⁶

Environment Protection and Biodiversity Conservation Amendment (Great Barrier Reef) Bill 2013

Senator Larissa Waters recently sponsored a Bill (**Great Barrier Reef Bill**) seeking to amend the EPBC Act for the purposes of prohibiting new port developments, as well as the ‘building, development, expansion or development’ of existing ports in designated areas, that impact the GBR World Heritage area. The designated areas were: the Fitzroy Delta; Balaclava Island; Port Alma; northern Curtis Island; the north section of the GBR as defined by the GBRMPA maps; any other area, to the extent that it could have a significant impact on one of the designated areas.¹⁸⁷

The Great Barrier Reef Bill included a second layer of prohibitions, specifying that the Minister must not, after 20 March 2013, approve an action if it would occur in either an existing port area located in or adjacent to the GBR World Heritage area, and if it would ‘impact individually or cumulatively on the World Heritage values of the GBR World Heritage area.’¹⁸⁸ The Bill further imposed a moratorium on any development likely to individually or cumulatively have a significant impact on the World Heritage values of the GBR on or after 20 March 2013, unless a strategic assessment of the GBR has been undertaken by the Government, and reviewed and deemed adequate by the World Heritage Committee.¹⁸⁹ The Great Barrier Reef Bill proposed to prohibit the Minister from approving any development that would not deliver ‘an overall net benefit for the world heritage values of the GBR World Heritage area.’ It also imposed a requirement on the Minister to develop a methodology (in the form of a legislative instrument) be applied to determine whether a development would deliver a ‘net benefit’.¹⁹⁰ The Bill was not passed.

PEL 460 – Putty Valley

Wollemi National Park forms part of the Greater Blue Mountains World Heritage Area. It is the second largest national park in NSW and contains the only known wild specimens of the Wollemi Pine (*Wollemia nobilis*), a species thought to have become extinct approximately thirty million years ago, but discovered in a remote section of the Park in 1994.¹⁹¹ On 19 August 2011, Macquarie Energy Pty Ltd (a wholly-owned subsidiary of Dart Energy Ltd) commenced CSG exploration activities comprising a single bore hole on a property in the Putty Valley. The site is located some 40 metres from Long Wheeney Creek, which runs into Putty Creek, Wollemi Creek, and the Colo River. The Colo River traverses the Wollemi National Park, before joining the Hawkesbury River.¹⁹² The Colo River was declared a 'Wild River' in 2008 and is protected under the *National Parks and Wildlife Act 1974* (NSW).¹⁹³ Macquarie Energy was not required to undertake an EIS examining potential impacts on the immediate environment, as well as the Wollemi National Park.¹⁹⁴ While Macquarie Energy ceased exploration activities in 2011, a search of government records indicates that its petroleum exploration licence (460) has been renewed and is valid until 08 July 2015.¹⁹⁵

4. Solution/recommendation for reform

1. Consistent with the World Heritage Convention, amend the EPBC Act so that it protects the 'OUV of a declared World Heritage property', as well as the 'world heritage values of a declared World Heritage property.'
2. Consistent with the Mission Report for the GBR World Heritage area, amend the EPBC Act so that it prohibits development that is likely to impact individually or cumulatively on OUV of all World Heritage properties in Australia.
3. Prohibit dumping of dredge spoil in the GBR World Heritage area and limit dredging to existing channels only.
4. Require buffer zones prohibiting coal and unconventional gas mining around World Heritage Areas.

9. Require comprehensive and accurate accounting of all emissions from coal and unconventional gas mining

1. Issue/problem

The energy sector accounts for 76 per cent of Australia's net carbon dioxide emissions, of which 37.5 per cent is derived from coal sources.¹⁹⁶ Two forms of coal are mined in Australia, high-quality bituminous coal (black coal) and lower-quality lignite (brown coal). Supporters of unconventional gas production claim that CSG, shale and tight gas emit less GHGs than coal,¹⁹⁷ making them ideal transition or bridging fuels between coal and renewables.¹⁹⁸ However, assertions of this nature downplay the potency of their principal constituent, methane, and the quantity of fugitive emissions associated with unconventional gas production. Unconventional gas is between 97 and 99 per cent methane. While its lifespan in the atmosphere is much shorter than that of carbon dioxide, it is more efficient at trapping radiation than the latter. Consequently, the Intergovernmental Panel in Climate Change (IPCC) estimates that methane has a global warming potential of 25 times more than carbon dioxide over 100 years and 72 times over 20 years.¹⁹⁹ The International Energy Agency (IEA) has identified the four main sources of methane emissions associated with unconventional gas production: intentional venting of gas for safety or economic reasons; fugitive emissions

including leaks in pipelines, valves or seals whether accidental or by design; incidents involving rupture of confining equipment; and incomplete burning.²⁰⁰ Of particular concern is the widespread failure to properly account for fugitive emissions, particularly in the broader landscape. Concerns remain that the GHG emissions levels associated with unconventional gas have been heavily underestimated, with at least one commentator suggesting that the full life cycle emissions from unconventional gas could be greater than those produced by coal.²⁰¹

2. Current law

Commonwealth regulation of GHG emissions operates under two complementary legislative regimes: the *National Greenhouse and Energy Reporting Act 2007*²⁰² (**NGER Act**) and the *Clean Energy Act 2011*²⁰³ (**Clean Energy Act**).

National Greenhouse and Energy Reporting Act 2007

The NGER Act has two objects. The first is to 'introduce a single national reporting framework for the reporting and dissemination of information related to GHG emissions, greenhouse gas projects, energy consumption and energy production of corporations.'²⁰⁴ The second object is to support the Clean Energy Act. The NGER Act also established the National Greenhouse and Energy Reporting Scheme which is used to develop the National Greenhouse Accounts, a series of four reports, published annually, which together form a comprehensive inventory of the nation's GHG emissions.²⁰⁵

The NGER Act makes reporting GHG emissions a mandatory requirement for corporations whose energy production, energy use or GHG emissions meet specific thresholds.²⁰⁶ The mechanism for this reporting is the *National Greenhouse and Energy Reporting (Measurement) Determination (Determination)*²⁰⁷ which prescribes methodology and criteria for calculating the production of energy, the consumption of energy, and GHG emissions. Methods for determining emissions under the Determination fall into two broad categories: direct monitoring, and estimation through the tracking of observable, closely-related variables.

Fugitive emissions of methane are currently estimated using data reported by facilities and submitted through the NGERs.²⁰⁸ Operators of CSG facilities are required to report fugitive emissions from all stages of exploration, processing and production if reporting thresholds are satisfied under the NGER Act,²⁰⁹ however current methods fail to incorporate all relevant fugitive emissions from CSG and measurement requirements have not been applied equally to other unconventional gas activities, for example, shale gas. The Commonwealth Government recently sought to amend the Determination to allow improved measurement and estimation of fugitive GHG emissions from CSG exploration and production.²¹⁰ The proposed National Greenhouse and Energy Reporting (Measurement) Amendment Determination 2013 (**Amendment Determination**) makes the application of Method 4 reporting of venting of fugitive emissions compulsory. Method 4 is direct measurement of emissions. However, Method 4 will not apply to wells where fracking technologies have not been used²¹¹ which is particularly problematic given an increased industry uptake of horizontal drilling methods (allowing gas collection a large distance from wells). Another key concern is that away from the bores and pipes, the NGER methods do not require consideration of fugitive emission escape from the broader landscape where there is potential for extensive drilling, dewatering and hydraulic fracturing to result in increased mobilisation and escape of methane through water pathways, geological flaws, fault lines, fissures and other gas seeps to the atmosphere. Early results from research by Southern Cross University show that elevated levels of both CH₄ and CO₂ can be measured in gas fields²¹² and these results may be attributable to increased leakage caused by the operation

of CSG activates. Without legal requirements to assess baseline and ongoing emission rates across gas fields, claims relating to how ‘clean’ unconventional gas may be compared with other fossil fuel sources cannot be substantiated.

Concerns regarding the rigor and accuracy of the methodologies used in Australia have been raised previously by ANEDO.²¹³ The current methodology is derived from techniques established by the US EPA and the Gas Research Institute in the 1990s.²¹⁴ However, new research suggests that methane loss may be as high as 9% of total production.²¹⁵ The IEA has also expressed doubts as to whether the current US based methodology is appropriate for measuring GHG emissions elsewhere in the world.²¹⁶ Local data is required to confirm these methodologies under local conditions, as ‘[d]ifferent assumptions about the level and impact of methane emissions can have a profound effect on the perception of gas as a ‘cleaner’ fossil fuel.’²¹⁷ We note that in early 2013 the CSIRO launched a project investigating fugitive emissions from CSG in Australia. The ultimate aim of the project is to develop suitable Australian-specific methods for monitoring and quantifying fugitive emissions from the CSG industry however, even this process appears limited in its scope and is designed to use estimates rather than measurements which is highly inappropriate given the large differences in geology and hydrology across Australia.

Clean Energy Act

The Clean Energy Act is part of a larger Clean Energy Legislative Package (**Package**) that consists of several complementary statutes designed to move Australia toward a low emissions future. The Package implemented two policy initiatives to place Australia on a low emissions trajectory: the carbon pricing mechanism, and related clean energy programs.

The carbon pricing mechanism is designed to apply to Australia’s biggest greenhouse gas emitters – known as liable entities. An entity is classified as liable if it exceeds the threshold for covered scope 1 emissions, i.e. ‘the release of greenhouse gas into the atmosphere as a direct result of an activity or series of activities (including ancillary activities) that constitute the facility’,²¹⁸ or if it supplies or uses natural gas.²¹⁹ The GHG emissions of liable entities cover approximately 60 per cent of all Australia’s total GHG emissions including the following sources: electricity generation; stationary energy; landfills; wastewater; industrial processes; and fugitive emissions.²²⁰ The mechanism does not apply to agriculture, land or forestry which is instead dealt with under the Carbon Farming Initiative.²²¹

Importantly the carbon pricing mechanism also does not apply to scope 3 emissions, i.e. indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities, outsourced activities, waste disposal, generated by Australian coal and unconventional gas in foreign jurisdictions. The majority of coal extracted in Australia is for export, with this figure set to increase in the coming years. Similarly, CSG is on the verge of becoming a major export industry.²²² Therefore while the mechanism may succeed in reducing Australia’s domestic GHG emissions, it does not address Australia’s significant contribution to global emissions.

The Clean Energy Act is relatively new and many of its provisions are still coming into operation and many of the provisions are currently proposed for change. As such, we are yet to see how the Commonwealth Government will implement key provisions in the Act and the Clean Energy Legislative Package generally. For example, a range of important matters are dealt with in the regulations, rather than the Act. These include the carbon pollution cap, the price floor and the international linking arrangements. These regulations are yet to be drafted.

3. Useful precedents or case studies

Colorado Emissions Study

Using data from the National Oceanic and Atmospheric Administration Earth System Research Laboratory (NOAA ESRL) and mobile sampling, a study in Colorado, USA²²³ found that methane emissions from natural gas operators may be underestimated by a factor of two. The study analysed air samples to determine the source of methane and found that "the main activity producing these compounds is related to oil and gas operations ". As a result, methane production from the Denver – Julesburg Fossil Fuel Basin, which had previously been estimated to be responsible for 15% of the state's methane production, may actually be responsible for at least 30% of the state's production. As noted previously, more recent research by the same team suggests that in some areas methane emissions from natural gas operations may be as high as 9% of total production²²⁴. The journal *Nature*²²⁵ has reported previous work by the Environmental Defense Fund and Princeton University that demonstrates that "shifting to natural gas from coal-fired generators has immediate climatic benefits as long as the cumulative leakage rate from natural-gas production is below 3.2%".²²⁶

4. Solution/recommendation for reform

1. Amend the NGER Act in the following ways:
 - a. To ensure that the NGER methods must explicitly apply to all forms of fossil fuel extraction, including oil and all forms of unconventional gas (shale gas, coal seam gas and tight gas).
 - b. All new CSG and unconventional gas projects should be required to complete baseline and ongoing assessments of gas leakage in the area/region affected by the project to quantify any increased escape of methane from pathways across the landscape. Existing projects should be required to assess current levels of gas leakage in the area/region.
 - c. NGERs should be expanded to immediately require Method 4 recording of fugitive emissions on all wells and flared emissions and to require assessment, verification and accounting of all emission pathways or changes to emission rates from the landscape.
 - d. Amend the definition of "emission" in the NGER Act 2007 to include "scope 3 emissions" and require reporting of scope 3 emissions by all companies engaged in the production of energy commodities (producing coal, natural gas, oil and their derivatives and uranium).
2. Amend the Clean Energy Act to include the requirement to account for scope 3 emissions by:
 - a. Amending the objects of Part 7 and adding a new section to that part to ensure that all companies engaged in the production of energy commodities (producing coal, natural gas, oil and their derivatives and uranium) for export measure and report their scope 3 emissions, and that any entity exporting energy commodities reporting a scope 3 emissions level above 25,000 tonnes is not covered by the emissions trading scheme, but is liable to pay an amount equal to the auction price of Australian carbon unit, if they are exporting to countries that do not have an ETS in place.

- b. Amending Part 7 so that money raised from payment for scope 3 emissions by energy commodity exporters is to be used to fund the Jobs and Competitiveness program and provide structural adjustment to regions where energy commodities are produced.

References

- ¹ This is evidenced by the number of local community groups that have formed across NSW, QLD and Victoria in opposition to CSG exploration and production activities. Examples include: 'Scenic Hills Association' (Campbelltown, NSW); 'CSG Free Northern Rivers' (Northern NSW); 'Western Downs Alliance' (Darling Downs, QLD); 'Gippsland Action Group' (Central Victoria). Similar groups have formed in respect of high-impact coal mining operations. These include: 'Bulga Milbrodale Progress Association' (Hunter Valley, NSW); Caroon Coal Action Group (Liverpool Plains, Northern NSW); Friends of Felton (Toowoomba region, QLD). There are also local chapters of the Lock the Gate Alliance in every State and Territory (excepting the ACT). See the following map: <http://www.lockthegate.org.au/groups>.
- ² See Geoscience Australia, *Coal Fact Sheet*, viewed 20 May 2013: <http://www.australianminesatlas.gov.au/education/fact_sheets/coal.html>; Geoscience Australia, *Coal Seam Gas Fact Sheet*, viewed 20 May 2013: <http://www.australianminesatlas.gov.au/education/fact_sheets/coal_seam_gas.html#resources>
- ³ See for example: Franks, D, et al, Managing the cumulative impacts of coal mining on regional communities and environments in Australia, *Impact Appraisal and Project Appraisal*, 28 (4), December 2010, pp. 299 – 312; National Water Commission, *Position Statement – Coal seam gas*, updated June 2013. Available at: <http://nwc.gov.au/nwi/position-statements/coal-seam-gas> (accessed 16 June 2013); Climate Commission, *The Critical Decade: Generating a Renewable Australia*, p. 2; Biggs, AJW, Witheyman, SL, Williams, KM, Cupples N, de Voil CA, Power, RE, Stone, BJ, (2012), *Assessing the salinity impacts of coal seam gas water on landscapes and surface streams*. August 2012.
- ⁴ See for example: ANEDO's submission to the Senate Standing Committee on Environment and Communications regarding the Environment Protection and Biodiversity Conservation Amendment (Retaining Federal Approval Powers) Bill 2012. Available at: <http://www.edo.org.au/policy/ANEDO-Submission-EPBC-Retaining-Federal-Approval-Powers-Bill-2012.pdf>; Submission on the *Draft Framework of Standards for Accreditation of Environmental Approvals under the EPBC Act 1999*, 23 November 2012. Available at: <http://www.edo.org.au/policy/policy.html>; ANEDO Report - Protect the laws that protect the places you love: An assessment of the adequacy of threatened species & planning laws in all jurisdictions of Australia, 2012. Available at: <http://www.edo.org.au/edonsw/site/pdf/pubs/121218Appendix1Reportontheadequacyofthreatenedspeciesandplanninglaws.pdf>.
- ⁵ See for example: *Environmental Planning and Assessment Act 1979* (NSW) (**EPA Act**), Part 4 (State Significant Development), Part 5, the former Part 3A (which is still applicable under transitional provisions).
- ⁶ Under the EPA Act, 'ecologically sustainable development' is but one object to be taken into account amongst many: *Minister for Planning v Walker [2008] NSWCA 224* per Hodgson J at 52. Similarly, under the *Mineral Resources Act 1989*, ss. 6A, 269 (4) (j) the court may only consider adverse, environmental impacts that are a direct result of mining activity: *Xstrata Coal Qld Pty Ltd & Ors v Friends of the Earth, Brisbane Co-Op Ltd & Ors [2012] QLC 13* per MacDonald CAC at 565.
- ⁷ Australia is a party to a number of environmental treaties potentially relevant to assessing the impacts of coal and unconventional gas mining including:
 - Convention Concerning the Protection of World Cultural and Natural Heritage (**World Heritage Convention**);
 - Convention on Biological Diversity (**Biodiversity Convention**);
 - Convention on Wetlands of International Importance, especially as Waterfowl Habitat (**Ramsar Convention**);
 - Convention on Migratory Species (**Bonn Convention**);
 - Stockholm Convention on Persistent Organic Pollutants (**Stockholm Convention**);
 - United Nations Framework Convention on Climate Change (**UNFCCC**) and the Kyoto Protocol;
 - United Nations Convention to Combat Desertification (**Desertification Convention**);
 - United Nations Convention on the Law of the Sea (**Law of the Sea Convention**);
 - Convention on Conservation of Nature in the South Pacific (**Apia Convention**).
 - China-Australia Migratory Bird Agreement (**CAMBA**).
 - Japan-Australia Migratory Bird Agreement (**JAMBA**).
 - Republic of Korea Migratory Bird Agreement (**ROKAMBA**).
- ⁸ See: *NSW v Commonwealth* (2006) 229 CLR 1.
- ⁹ See for example *Pellow v Umoona Community Council* (AIRC, SDP, O'Callaghan, PR973365, 19 July Community Council to be classified as a 'trading corporation' for the purposes of s. 51 (xx).

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- 10 Redfern v Dunlop Rubber Australia Ltd (1964) 110 CLR 194.
- 11 See for example Teori Tau v The Commonwealth (1969) 119 CLR 564; Spratt v Hermes (1965) 114 CLR 226;
- 12 Murphyores Incorporated Pty Ltd v Commonwealth (1976) 136 CLR 1; [1976] HCA 20. See also Burton v Honan (1952) 86 CLR 169 in which Dixon J argued at 17 that there must be a 'reasonable connection' between the law relying on the incidental power, and the subject of the main power.
- 13 For example, in NSW there is no law that requires a landholder to sell their property.
- 14 For a full account of the deficiencies of the compensation framework in NSW, see EDO NSW's publication Mining Law Discussion Paper, pp. 52-55.
- 15 Darmody, R.G. et al, Agricultural Impacts of Coal Mine Subsidence: Effects on Corn Yields, *Journal of Environmental Quality*, Vol. 18, No. 3, pp. 265-7.
- 16 This is reflected in the terms of the Intergovernmental Agreement on the Environment (IGAE), Schedule 2, cl. 4.
- 17 EPBC Act, s. 134.
- 18 Standing Council on Energy and Resources, *National Harmonised Regulatory Framework for Natural Gas from Coal Seams*, May 2013. Available at: <http://scer.govspace.gov.au/files/2013/06/National-Harmonised-Regulatory-Framework-for-Natural-Gas-from-Coal-Seams.pdf> (accessed 06 June 2013).
- 19 Council of Australian Governments Standing Council on Energy and Resources, *The National Harmonised Regulatory Framework for Natural Gas from Coal Seams*, 2013, p. 8.
- 20 Ibid, p. 9.
- 21 Ibid, p. 3.
- 22 Ibid. p. 3.
- 23 Council of Australian Governments Standing Council on Energy and Resources, *Multiple Land Use Framework*, December 2011.
- 24 <http://www.scer.gov.au/workstreams/land-access/mluf/> (Accessed 06/06/2013).
- 25 http://www.edo.org.au/edonsw/site/pdf/subs/130228CSG_draft_national_framework_ANEDO.pdf. At p. 3.
- 26 Ibid.
- 27 John Williams Scientific Services Pty Ltd, *An analysis of coal seam gas production and natural resource management in Australia, A report prepared for the Australian Council of Environmental Deans and Directors*, October 2012, p. 106.
- 28 See: <http://www.daff.gov.au/agriculture-food/food/australian-council-on-food>
- 29 *Landholders' Right to Refuse (Coal Seam Gas) Bill 2011*, s. 9.
- 30 Ibid, s. 10.
- 31 Ibid, s. 7.
- 32 Available at:
http://www.aph.gov.au/parliamentary_business/committees/senate_committees?url=clac_ctte/air_quality/index.htm
- 33 Centre for Air quality & health Research and evaluation Submission 29 available at:
http://www.aph.gov.au/parliamentary_business/committees/senate_committees?url=clac_ctte/air_quality/submissions.htm
- 34 See for example testimony from Professor Guy Marks, Centre for Air Quality and Health Research and Evaluation, to the Senate Committee.
- 35 Official statement of the American Thoracic Society, 'What constitutes an adverse health effect of air pollution?' (2000) 161 *American Journal of Respiratory & Critical Care Medicine* 665, 665-673.
- 36 For a list of references see the Senate inquiry A more recent example is Raaschou-Nielsen et al 2013 Air pollution and lung cancer incidence in 17 European cohorts: prospective analyses from the European Study of Cohorts for Air Pollution Effects (ESCAPE) *The Lancet* Available at: [http://dx.doi.org/10.1016/S1470-2045\(13\)70279-1](http://dx.doi.org/10.1016/S1470-2045(13)70279-1)
- 37 Australian Medical Association submission to the inquiry on "The impacts on health of air quality in Australia" Available at: <https://ama.com.au/inquiry-impacts-health-air-quality-australia>
- 38 Cook (2013) *Life Cycle of Coal Seam Gas Projects: Technologies and Potential Impacts* Available at: http://www.chiefscientist.nsw.gov.au/__data/assets/pdf_file/0010/31321/Life-Cycle-of-Coal-Seam-Gas-Report_FINAL_PJC.pdf
- 39 IGAE, Schedule 4.
- 40 See: <http://www.scew.gov.au/publications/pubs/coag-standing-council-on-environment-and-water-terms-of-reference.pdf> (accessed 11 June 2013).

- 41 *National Environment Protection Council Act 1994 (ACT)*; *National Environment Protection Council (NSW) Act 1994 (NSW)*; *National Environment Protection Council (NT) Act 1994 (NT)*; *National Environment Protection Council (QLD) Act 1994 (QLD)*; *National Environment Protection Council (SA) Act 1994 (SA)*; *National Environment Protection Council (Tas) Act 1994 (Tas)*; *National Environment Protection Council (Vic) Act 1994 (Vic)*; *National Environment Protection Council Act (WA) 1994 (WA)*.
- 42 NEPC Act (Cth), s. 12.
- 43 *Ibid*, s. 14 (3).
- 44 A summary of the NEPM standards are available at:
<http://www.environment.gov.au/atmosphere/airquality/standards.html>.
- 45 National Environment Protection Council Service Corporation (2006) *National Environment Protection (Ambient Air Quality) Measure Review Report* Available at:
<http://www.scew.gov.au/sites/www.scew.gov.au/files/resources/3405e986-afe9-bdb4-5d2c-383f3ea1e911/files/aaq-review-report-2011.pdf>.
- 46 The NSW Government has recently released a new State Environment Planning Policy that sets air quality targets for PM10 that must be achieved at private residences (although failure to achieve this target does not mandate project approval).
- 47 A more comprehensive discussion of current legislative failings in relation to particulate matter and health is available in the ANEDO submission to the inquiry on “The impacts on health of air quality in Australia”, available at: <http://www.edo.org.au/policy/policy.html>.
- 48 *Draft significant impact guidelines: Coal seam gas and large coal mining developments - impacts on water resources* Available at: <http://www.environment.gov.au/epbc/about/water-trigger.html>
- 49 *National Environment Protection (National Pollutant Inventory) Measure (Cth)*, cl. 5.
- 50 *Ibid*, cl. 6.
- 51 See: <http://www.npi.gov.au/data/index.html> (accessed 13 June 2013).
- 52 *Ibid*, cl. 8.
- 53 *National Environment Protection (National Pollutant Inventory) Measure (Cth)*, cl. 8.
- 54 For example, in NSW it is implemented under the *Protection of the Environment Operations (General) Regulation 2009*, which includes reporting requirements for relevant facilities, while in QLD it is implemented under the *Environment Protection Regulation 2008*, which also includes reporting requirements for such facilities.
- 55 IGAE, Schedule 4, Cls. 13 – 15.
- 56 IGAE, Schedule 4, Cl. 16.
- 57 IGAE, cl. 2.3.
- 58 IGAE, Section 3.
- 59 *National Forest Policy Statement*, 2nd Edition 1995, p. 19.
- 60 <http://www.daff.gov.au/> Accessed 18/7/2013.
- 61 <http://www.daff.gov.au/forestry/policies/rfa> Accessed 18/7/2013.
- 62 *National Forest Policy Statement*, 2nd Edition 1995, p. 8
- 63 *National Forest Policy Statement*, 2nd Edition 1995, p. 11
- 64 *National Forest Policy Statement*, 2nd Edition 1995, p. 15
- 65 *National Forest Policy Statement*, 2nd Edition 1995, p. 20
- 66 See: Feehely, J, Hammond-Deakin N, and Milner F (2013) *One Stop Chop: How Regional Forest Agreements streamline environmental destruction*. Lawyers for Forests, Melbourne Australia.
- 67 *Intergovernmental Agreement on the Reform of Commonwealth-State Financial Relations*, Natural Gas Pipelines, 7 November 1997, ACCESS AGREEMENT. Available at: <http://www.coag.gov.au/node/51>.
- 68 Australian Coal Association, *Exports*, available at: <http://www.australiancoal.com.au/exports.html> (accessed 26 June 2013)
- 69 Australian Coal Association, *Exports*, available at: <http://www.australiancoal.com.au/exports.html> (accessed 26 June 2013)
- 70 See: http://www.ret.gov.au/resources/mining/australian_mineral_commodities/mineral-export/Pages/mineral_export_controls.aspx
- 71 See: <http://www.daff.gov.au/forestry/industries/export>
- 72 See: <http://trove.nla.gov.au/version/42214967>
- 73 See: <http://www.austlii.edu.au/au/cases/cth/HCA/1976/20.html>
- 74 See: <http://www.comlaw.gov.au/Details/C2013B00057>
- 75 This is the case in NSW. See *Water Management Act 2000 (NSW)*, s. 611.

- ⁷⁶ See for example the *Hunter Unregulated Alluvial Water Sharing Plan*, cl. 68 (6), which exempts mining and CSG developments from rules to protect aquifers and interconnected rivers during periods of drought. See also Carmody, Emma, Exemptions from cease-to-pump rules in the Hunter coal fields: Mines 1, Aquifers 0, *Australian Environment Review*, June 2013, pp. 567-9.
- ⁷⁷ NSW Scientific Committee (2005) – *Final Determination. Alteration of habitat following subsidence due to longwall mining - key threatening process listing*. Available at: <http://www.environment.nsw.gov.au/determinations/LongwallMiningKtp.htm>
- ⁷⁸ National Water Commission (2010) Coal Seam Gas and Water Position Statement. Available at: <http://nwc.gov.au/nwi/position-statements/coal-seam-gas> (accessed 11 June 2013).
- ⁷⁹ van der Elst, N., Savage, H., Keranen, K. and Abers, G. (2013) Enhanced Remote Earthquake Triggering at Fluid-Injection Sites in the Midwestern United States *Science* 12 July 2013: Vol. 341 no. 6142 pp. 164-167.
- ⁸⁰ Moran, C., da Costa, J., Cuff, C. (2013) *Independent Scientific Panel Report On Underground Coal Gasification Pilot Trials* Queensland Independent Scientific Panel for Underground Coal Gasification June 2013: mines.industry.qld.gov.au/assets/legislation-pdf/isp-final-report-cs-review.pdf
- ⁸¹ For example, in NSW water use is regulated under the *Water Management Act 2000* (NSW) and associated regulations and water sharing plans; water pollution is regulated under the *Protection of the Environment Operations Act 1997* (NSW) and associated regulations and policies; environmental impacts associated with development (including impacts on water resources) are managed under the *Environmental Planning and Assessment Act 1979* (NSW) and associated regulations and environmental planning instruments.
- ⁸² EPBC Act (Cth), s. 528; Water Act, s. 4.
- ⁸³ Environment Protection and Biodiversity Conservation Amendment (Independent Expert Scientific Committee on CSG and Large Coal Mining Development) Bill 2012 (Cth), now incorporated into the EPBC Act under ss. 131AB and 136(2)(fa).
- ⁸⁴ EPBC Act, s 505D outlines the Committee's functions.
- ⁸⁵ See conditions 20 and 22 of the approval by the Minister dated 11 March 2013 for Gloucester Coal Seam Methane Gas Project, Gloucester region, under the EPBC Act, ss. 130 and 133.
- ⁸⁶ Water Act (Cth), Part 2.
- ⁸⁷ Basin Plan, Chapter 10. Water resource plans will need to be accredited by 2019 as this is when sustainable diversion limits mandated under the Basin Plan come into effect. See Basin Plan, cl. 6.04.
- ⁸⁸ Basin Plan, Chapter 14.
- ⁸⁹ The trade of water access licences is managed in: NSW under *the Water Management Act 2000* (NSW), and associated water sharing plans and dealing protocols; in QLD under the *Water Act 2000* (QLD) and associated water resource plans; in South Australia under the *Natural Resources Management Act 2004* (SA) and associated water resource plans; in Victoria under the *Water Act 1989* (Vic) and associated water resource plans and trading rules.
- ⁹⁰ Murray-Darling Basin Authority, *Guide to the Proposed Basin Plan, Technical Background: Part 1*, 2010, p. 24.
- ⁹¹ Water Act 2007 (Cth), s. 25 (3).
- ⁹² Basin Plan, Chapter 9, cl. 9.11.
- ⁹³ NWI, cl. 23.
- ⁹⁴ Ibid.
- ⁹⁵ Ibid, Schedule A.
- ⁹⁶ Ibid, Schedule C.
- ⁹⁷ Ibid, cl. 34.
- ⁹⁸ National Water Commission, *The National Water Initiative – securing Australia's water future: 2011 assessment*, Executive Overview, p. 14.
- ⁹⁹ See: <http://www.environment.gov.au/water/policy-programs/nwqms/#guidelines> (accessed 14 June 2013).
- ¹⁰⁰ Specifically, they are defined as: 'Particular values or uses of the environment that are important for a healthy ecosystem or for public benefit, welfare, safety or health and that require protection from the effects of pollution, waste discharges and deposits. Several environmental values may be designated for a specific waterbody.' See National Water Quality Management Strategy, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volume 1, The Guidelines (Chapters 1 – 7)*, October 2000, p. A10.
- ¹⁰¹ National Water Quality Management Strategy, *Water Quality Management – An Outline of the Policies*, April 1994, p. 6.
- ¹⁰² National Water Quality Management Strategy, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volume 1, The Guidelines (Chapters 1 – 7)*, October 2000, pp. 1-1 – 1-2.
- ¹⁰³ Department of Sustainability, Environment, Water, Population and Communities, *Evaluation of the National Water Quality Management Strategy, Final Report*, December 2011, p. 37.

- ¹⁰⁴ Ibid, p. 42.
- ¹⁰⁵ Ibid, p. 12.
- ¹⁰⁶ See for example: Azzone, Giovanni et al, Defining Environmental Performance Indicators: An Integrated Framework, *Business Strategy and The Environment*, Volume 5, Issue 2, 1996 pp. 69-80; Daniel Tyteca, On the Measurement of the Environmental Performance of Firms – A Literature Review and a Productive Efficiency Perspective, *Journal of Environmental Management*, Volume 46, Issue 3, 1996, pp. 281-308.
- ¹⁰⁷ Bately, Graeme. E., Kookana, Rai. S., Environmental issues associated with coal seam gas recovery: managing the fracking boom, *Environ. Chem. (CSIRO Publishing)*, 2012, 9, p. 425.
- ¹⁰⁸ CSIRO, *What is hydraulic fracturing?*, April 2012, p. 2 (note pages numbers not specified in document).
- ¹⁰⁹ Golder Associates, *Coal Seam Hydraulic Fracturing Fluid Environmental Risk Assessment: Response to the Coordinator-General Requirements for Coal Seam Gas Operations in the Surat And Bowen Basins Queensland* (prepared for Santos Ltd), October 2010, p. 54.
- ¹¹⁰ However, if mandatory disclosure is imposed as a condition of title, this would be enforceable under the *Petroleum (Onshore) Act 1991*. Nevertheless, the Act does not require that such a condition be imposed on titles. Specifically, the Minister may direct a title holder to comply with the conditions of the title: s. 77(1). Penalties are attached when the title holder fails to comply with the direction: s 77(2). It is an offence to contravene any conditions of a title: s. 136A (1).
- ¹¹¹ NSW Government, *Code of Practice for Coal Seam Gas: Fracture Stimulation Activities*, p. 7; Strategic Regional Land Use Policy, *Frequently Asked Questions*. Available at: http://www.nsw.gov.au/sites/default/files/uploads/common/CSG-FAQ_SD_v01.pdf (downloaded 20 June 2013).
- ¹¹² National Toxics Network (Dr. Mariann Lloyd-Smith, Dr. Rye Senjen), *Hydraulic Fracturing in Coal Seam Gas Mining: The Risks to our Health, Communities, Environment and Climate*, September 2011, pp. 10-11.
- ¹¹³ A material safety data sheet is a document that provides health and safety information about products, substances or chemicals. They are prepared by manufacturers and importers of 'dangerous goods' and 'hazardous substances'. For further information, see for example WorkSafe Victoria, *Material Safety Data Sheets*. Available at: <http://www.worksafe.vic.gov.au/safety-and-prevention/health-and-safety-topics/material-safety-data-sheets> (accessed 16 June 2013).
- ¹¹⁴ Bately, Graeme. E., Kookana, Rai. S., Environmental issues associated with coal seam gas recovery: managing the fracking boom, *Environ. Chem. (CSIRO Publishing)*, 2012, 9, p. 426.
- ¹¹⁵ For more information about Cyclohexylamine see the following hazardous substance fact sheet produced by the New Jersey Department of Health: <http://nj.gov/health/eoh/rtkweb/documents/fs/0576.pdf> (accessed 15 June 2013).
- ¹¹⁶ For more information about this Act, see the United States Environmental Protection Agency website: <http://www.epa.gov/agriculture/lcra.html> (accessed 15 June 2013).
- ¹¹⁷ United States House of Representatives Committee on Energy and Commerce, Minority Staff, *Chemicals used in Hydraulic Fracturing*, April 2011, p. 1. Available at: <http://democrats.energycommerce.house.gov/sites/default/files/documents/Hydraulic-Fracturing-Chemicals-2011-4-18.pdf> (accessed 16 June 2013).
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- ¹¹⁹ National Assessment of the Chemicals Associated with Coal Seam Gas Extraction, including risks associated with surface handling of chemicals in hydraulic fracturing and flowback/produced waters. Further information available at: <http://www.nicnas.gov.au/issues-and-consultations/issues/fracking-hydraulic-fracturing-coal-seam-gas-extraction/information-sheet>.
- ¹²⁰ <http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-nicnas-draft-regulation-impact-statement.htm>.
- ¹²¹ NSW Government, *Code of Practice for Coal Seam Gas: Fracture Stimulation Activities*, p. 7.
- ¹²² S. 16 of the Natural Resources and Other Legislation Amendment Act (No 2) 2010 (QLD) inserts s. 312W into the *Environmental Protection Act 1994* (QLD). This is complemented by the *Environment Protection Amendment Regulation* (No. 3), 2011, which restricts the use the four BTEX chemicals to 1, 80, 180, 75 parts per billion, respectively.
- ¹²³ *Industrial Chemicals (Notification and Assessment) Act 1989*, s. 3 (a) (i).
- ¹²⁴ Ibid, s. 21
- ¹²⁵ Ibid, s. 14 (1), (2).
- ¹²⁶ Ibid, s. 11.

- ¹²⁷ Department of Environment and Heritage, *National Profile of Chemicals Management Infrastructure in Australia*, 1998, p. 24. This is corroborated by up-to-date information published on the NICNAS website. According to NICNAS, only 2,700 of the 40,000 chemicals on the register have been assessed.
- ¹²⁸ *Industrial Chemicals (Notification and Assessment) Act 1989*, s. 13.
- ¹²⁹ *Ibid.* 12.
- ¹³⁰ *Ibid.*, ss. 14 (4); 18A; 19 (6).
- ¹³¹ *Ibid.*, s. 39; *Industrial Chemicals (Notification and Assessment) Regulations 1990*, cl. 8b.
- ¹³² *Industrial Chemicals (Notification and Assessment) Act 1989*, s. 50B.
- ¹³³ *Ibid.*, ss. 55, 57.
- ¹³⁴ *Ibid.*, ss. 63.
- ¹³⁵ *Ibid.*, s. 61.
- ¹³⁶ *Ibid.*, s. 51 (4), (5) (read in conjunction with 51 (2)).
- ¹³⁷ *Ibid.*
- ¹³⁸ *Ibid.* s. 62.
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- ¹⁴¹ Standing Council on Energy and Resources, *National Harmonised Regulatory Framework for Natural Gas from Coal Seams*, May 2013, p. 8. Available at: <http://scer.govspace.gov.au/files/2013/06/National-Harmonised-Regulatory-Framework-for-Natural-Gas-from-Coal-Seams.pdf> (accessed 06 June 2013).
- ¹⁴² Principles for Better Environmental Management of Chemicals, Ministerial Agreement, p.1. Available at: http://www.scew.gov.au/publications/pubs/chemicals/cmgt_rpt_principles_for_better_management_of_chemicals_ministerial_agreement_200706.pdf (accessed 18 June 2013).
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- ¹⁴⁴ Mufson, Steven, *Obama administration delivers draft fracking regulation*, Washington Post, May 16 2013. Available at: http://articles.washingtonpost.com/2013-05-16/business/39305945_1_fracking-regulations-fracfocus-hydraulic-fracturing (accessed 26 June 2013). See also, Konschnik, K. et al, *Legal Fractures in Chemical Disclosure Laws: Why the Voluntary Chemical Disclosure Registry FracFocus Fails as a Regulatory Compliance Tool*, Harvard Law School, April 23 2013. Available at: <http://blogs.law.harvard.edu/environmentallawprogram/files/2013/04/4-23-2013-LEGAL-FRACTURES.pdf> (accessed 27 June 2013).
- ¹⁴⁵ McFeeley, Matthew, *State Hydraulic Fracturing Rules and Enforcement: A Comparison*, *Natural Resources Defence Council Issue Brief*, July 2012, p. 9.
- ¹⁴⁶ Earthjustice, *Wyoming Fracking Chemical Information Disclosure*, Case No. 2300. Available at: http://earthjustice.org/our_work/cases/2012/wyoming-fracking-chemical-information-disclosure (accessed 27 June 2013).
- ¹⁴⁷ See <http://www.environment.nsw.gov.au/determinations/LongwallMiningKtp.htm>. A key threatening process is a process that threatens, or could threaten, the survival or evolutionary development of species, populations or ecological communities – in particular if it adversely affects two or more threatened species, populations or ecological communities; or could cause species, populations or ecological communities that are not currently threatened to become threatened.
- ¹⁴⁸ See, for example, *Minister for Planning v Moolarben Coal Mines Pty Ltd* [2010] NSWLEC 147.
- ¹⁴⁹ EPBC Act (Cth), Part 3.
- ¹⁵⁰ *Ibid.*, s. 523. Actions do not include Commonwealth, State or Territory decisions or authorisations granted under some Acts such as the *Customs Act 1901* (Cth).
- ¹⁵¹ *Ibid.*, Part 3, ss. 12, 15A, 15B, 15C, 16, 17B, 18, 18A, 20, 20A, 21, 22A, 23, 24A, 24B, 24C (offence provisions); Part 9 (approval provisions).
- ¹⁵² *Booth v Bosworth* [2001] FCA 1453, 99.
- ¹⁵³ Department of Sustainability, Environment, Water, Population and Communities, *Significant Impact Guidelines 1.1: Matters of National Environmental Significance*, December 2009. Available at: <http://www.environment.gov.au/epbc/publications/nes-guidelines.html>
- ¹⁵⁴ *Ibid.*, s. 87.
- ¹⁵⁵ Australian Government, Department of Sustainability, Environment, Water, Population and Communities, *Annual Report 2010-11*, p. 143.
- ¹⁵⁶ EPBC Act, s. 101A.
- ¹⁵⁷ EPBC Act, s. 136.
- ¹⁵⁸ NSW Government, Planning and Infrastructure, *Bilateral Agreements with the Commonwealth*. Available at:

- <http://www.planning.nsw.gov.au/AboutUs/GovernmentAgreementsandForums/BilateralAgreementwiththeCommonwealth/tabid/283/language/en-AU/Default.aspx> (accessed 20 June 2013).
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- 160 See for example: Australian Network of Environmental Defender's Offices, 'Submission on Draft Framework of Standards for Accreditation of Environmental Approvals under the EPBC Act 1999', November 2012; and 'Submission on Environment Protection and Biodiversity Conservation Amendment (Retaining Federal Approval Powers) Bill 2012', January 2013. Both are available at www.edo.org.au.
- 161 EPBC Act, s. 528 (definitions of large coal mining development and large CSG development).
- 162 *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) Amendment (Resource Significance) 2013* available at: http://planspolicies.planning.nsw.gov.au/index.pl?action=view_job&job_id=6065.
- 163 These include: Ramsar Convention (Bowling Green Bay listed in 1993; Shoalwater and Corio Bays listed in 1996); 1973 International Convention for the Prevention of Pollution from Ships; CITES Convention; Bonn Convention; 1982 United Nations Convention on the Law of the Sea. The GBR was designated as a 'Particularly Sensitive Sea Area' by the International Maritime Organization in 1990.
- 164 EPBC Act, Part 3, subdivision A.
- 165 EPBC Act, s. 136.
- 166 EPBC Act, s. 137.
- 167 United Nations Educational, Scientific and Cultural Organisation (UNESCO), *World Heritage (Australia)*. Available at: <http://whc.unesco.org/en/statesparties/au> (accessed 21 June 2013).
- 168 Haigh, David, *Australian World Heritage, the Constitution and international law*, (2005), EPLJ, p. 388.
- 169 Haigh, David, *Australian World Heritage, the Constitution and international law*, (2005), EPLJ, pp. 392-3.
- 170 *Ibid*, p. 392.
- 171 World Heritage Convention, Preamble, Articles 1, 2, 3, 4, 5 (read in conjunction with one another).
- 172 http://www.ohsa.com.au/assets/ohsa_documents/MAP/map-assets/qld_coal_map_08.pdf (accessed 29 May 2013).
- 173 Three mines fall into this category: Alpha West, Alpha North and Degulla. A concept study has been completed for Alpha West. The underground mine will ultimately produce 24 million tonnes of coal per annum. See: <http://hancockcoal.com.au/index.php/current-projects/alpha-west> (accessed 29 May 2013). Feasibility studies have been produced for Alpha North. The mine will ultimately produce 56 million tonnes of coal per annum. See: <http://www.waratahcoal.com/alpha-north-coal-project.htm> (accessed 29 May 2013). Degulla has been described by Vale as a 'growth project'. It is uncertain how much coal it would produce. See Vale's submission to the House of Representatives Committee Inquiry into the use of 'fly-in, fly-out' (FIFO) workforce practices in regional Australia: http://www.aph.gov.au/Parliamentary_Business/Committees/House_of_Representatives_Committees?url=ra/fifodido/index.htm (accessed 29 May 2013).
- 174 The following five mines are under assessment: Carmichael Coal Mine and Rail; China First; Chine Stone; Kevin's Corner; South Galilee Coal. See: <http://www.dsdip.qld.gov.au/assessments-and-approvals/current-eis-projects.html> (accessed 29 May 2013).
- 175 Alpha Coal Mine received final approval under the EPBC Act on 23 August 2012: http://www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=4648 (accessed 29 May 2013).
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- 177 Great Barrier Reef Marine Park Authority, *Ports in the Great Barrier Reef*. Available at: http://www.gbrmpa.gov.au/_data/assets/pdf_file/0009/28809/Ports-in-the-Great-Barrier-Reef.pdf (accessed 23 June 2013).
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- 182 Great Barrier Reef Marine Park Authority, *Current Proposals (Under assessment)*. Available at: <http://www.gbrmpa.gov.au/about-us/consultation/current-proposals> (accessed 21 June 2013).
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- ¹⁸⁵ See: http://www.gbrmpa.gov.au/_data/assets/pdf_file/0019/28810/Ports-challenges-for-the-Great-Barrier-Reef.pdf (accessed 29 May 2013).
- ¹⁸⁶ United Nations Educational, Scientific And Cultural Organization (UNESCO), World Heritage Committee, Thirty-sixth session, Saint Petersburg, Russian Federation, 24 June – 6 July 2012, Item 7 of the Provisional Agenda: State of conservation of properties inscribed on the World Heritage List and/or on the List of World Heritage in Danger, *Mission Report Great Barrier Reef (Australia) (N 154) 6 – 14 March 2012 / 6 – 14 mars 2012*.
- ¹⁸⁷ Great Barrier Reef Bill, s. 24D.
- ¹⁸⁸ *Ibid.*, s. 24F.
- ¹⁸⁹ *Ibid.*, s. 24F.
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