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EPRI ELECTRIC POWER RESEARCH INSTITUTE

Strategic Analysis of the Global Status of Carbon Capture and Storage

Report 3: Country Studies Australia

Final Report

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Strategic Analysis of the Global Status of Carbon Capture and Storage

Report 3: Country Studies Australia

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This report:

1. *states the law current as at 31 March 2009*
2. *should not be relied upon as a substitute for specific legal advice*
3. *has links and references throughout that were current as at 31 March 2009*
4. *represents the views of Baker & McKenzie only and not of any person or agency that may have contributed to or reviewed any aspect of the report*

Contents

List of tables

List of case studies

1. Executive summary

Australia has been proactive in implementing policies and legislation to support the development and deployment of carbon capture and storage (CCS) technologies. This has been driven by:

- domestic and international policies, including the proposed Carbon Pollution Reduction Scheme (CPRS), which aim to impose a cost on CO_2;
- recognition by Australian Governments of the need to ensure that Australian coal mining operations can continue in the long term to make a significant contribution to Australia's economic performance as the cost of greenhouse gas (GHG) emissions is increasingly incorporated into fossil fuel purchasing and investment decisions; and
- geological research indicating the existence of significant potential within Australia for CO_2 sequestration.

The Australian Government recently announced funding of A$2 billion (US$1.62 billion) for CCS projects over the next nine years, including through the establishment of the Global CCS Institute. Queensland has also allocated A$300 million (US$244 million) from the Queensland Future Growth Fund for research and development. Other States have also allocated funding to CCS-related research, including the Victorian Government's cooperative research centre for Clean Power from Lignite. The Australian Government and a number of States are members of the Cooperative Research Centre for Greenhouse Gas Technologies (CO2CRC). The CSIRO, Australia's leading scientific research body has been involved in CCS research for several years.

Australian Governments have introduced policies and legislation with the intended effect of imposing a cost on emissions of CO_2. New South Wales and the Australian Capital Territory have a mandatory cap and trade scheme in the form of the Greenhouse Gas Reduction Scheme (GGAS) and the Australian Government is developing implementing legislation for national cap and trade scheme, CPRS. Neither GGAS nor the CPRS explicitly aim to provide incentives to the development of CCS technologies or projects. They will, however, be instrumental to imposing a cost on CO_2 emissions and making CCS technologies cost-effective, although in the early stages of the CPRS its effectiveness as a CO_2 cost pricing mechanism will be limited somewhat by assistance measures for large emitters.

In recent months the Australian Government, Queensland and Victoria have implemented legislation for the capture, transport and injection of CO_2 and the closure of CO_2 injection wells. South Australia is developing similar legislation and Western Australia has project-specific legislation for the Gorgon project off the north western coast of that State. The Federal, Victorian and Queensland legislation in particular provide comprehensive legislative frameworks for the storage of CO_2 in underground and undersea geological formations in those jurisdictions. In general terms, this legislation provides robust frameworks for the ownership of storage formations and management of injected CO_2 and long-term liabilities arising from stored material. The Victorian and Queensland legislation is also integrated with pipelines legislation. No regulations have yet been passed in respect of this legislation and it remains to be seen how effectively these statues will in practice regulate CCS activities.

2. Glossary

A$	Australian Dollars
Barrow Island Act	*Barrow Island Act 2003* (WA)
CEGT	Centre for Energy and Greenhouse Gas Technologies
CLET	Centre for Low Emission Technology
CO2CRC	Cooperative Research Centre for Greenhouse Gas Technologies
CO2TECH	CO2CRC Technologies Pty Ltd
GGS Act	*The Australian Government's Offshore Petroleum and Greenhouse Gas Storage Act 2008* (Cth)
CPRS	Carbon Pollution Reduction Scheme
CPRS Bill	*Carbon Pollution Reduction Scheme Bill 2009* (Cth)
CPRS EM	Explanatory Memorandum, Carbon Pollution Reduction Scheme Bill 2009 (Cth)
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DCC	Australian Government Department of Climate Change
EES	Environmental Effects Statement
EITE	Emissions-intensive trade-exposed
EPBC Act	*Environmental Protection and Biological Diversity Act 1997* (Cth)
EPI	Environmental planning instrument
Global CCS Institute	Global Carbon Capture and Storage Institute
GGAS	Greenhouse Gas Reduction Scheme (NSW and ACT)
GWh	Gigawatt hour
IDAS	Integrated Development Assessment System
LNG	liquefied natural gas
London Protocol	1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972
MWh	Megawatt hour
MRET	Mandatory Renewable Energy Target
NGER Act	*National Greenhouse and Energy Reporting Act 2007* (Cth)
NGER Regulations	National Greenhouse and Energy Reporting Regulations 2008 (Cth)
NRET	National Renewable Energy Target

PACE	Plan for Accelerating Exploration
ppm	Parts per million
Queensland EP Act	*Environmental Protection Act 1994* (Qld)
Queensland GGS Act	*Greenhouse Gas Storage Act 2009* (Qld)
Queensland IP Act	*Integrated Planning Act 1997* (Qld)
Queensland PG Act	*Petroleum and Gas Act (Production and Safety) Act 2004*
REC	Renewable Energy Certificate
RET	National Renewable Energy Target
UCC	Ultra Clean Coal
Victorian DPI	Victorian Government Department of Primary Industries
Victorian GGGS Act	*Greenhouse Gas Geological Sequestration Act 2008* (Vic)
Victorian PE Act	*Victorian Planning and Environment Act 1987* (Vic)
Victorian Pipelines Act	*Pipelines Act 2005* (Vic)
VRET	Victorian Renewable Energy Target
WA DMP	Western Australian Government Department of Mines and Petroleum
White Paper	Australian Government Department of Climate Change 2008 White Paper: Carbon Pollution Reduction Scheme: Australia's Low Carbon Future

3. The effect of pricing carbon

3.1 Introduction

Australian jurisdictions have introduced a range of policies and legislation supporting the development of low emission technologies by imposing a cost on GHG emissions. Principal among these is the Australian Government's Carbon Pollution Reduction Scheme (CPRS), which will impose a cost on CO_2 from its proposed commencement on 1 July 2011. The Australian Capital Territory and New South Wales Greenhouse Gas Reduction Scheme (GGAS) introduced a CO_2 price when it commenced operation in 2003 and 2005 respectively. There are no Australian CO_2 taxation schemes, however a range of renewable energy and other schemes indirectly contribute to CO_2 cost imposition.

3.2 Mandatory cap and trade schemes

A mandatory cap and trade scheme has already been implemented in Australia and another is currently under development.

New South Wales and the Australian Capital Territory have implemented the New South Wales GHG Reduction Scheme and the Australian Capital Territory GHG Reduction Scheme, which are referred to collectively as GGAS. GGAS was implemented through amendment to the *Electricity Supply Act 1995* (NSW) and the *Electricity (GHG Emissions) Act 2004* (ACT), together with supporting regulations. GGAS has the twin purposes of reducing GHG emissions associated with the production and use of electricity and encouraging participation in offsetting activities. GGAS commenced on 1 January 2003 and 1 January 2005 in the Australian Capital Territory. The scheme works by establishing an annual state-wide GHG benchmark for the electricity sector. It requires individual benchmark participants (covered entities) to meet their allocation of the mandatory GHG benchmark, based on their share of electricity demand.[1] It is expected that GGAS will be superseded by the Federal-level CPRS.

The Australian Government has indicated that the CPRS will commence on 1 July 2011. Detailed proposed policy settings for the CPRS Bill were discussed in the Australian Government's Green Paper and White Paper Policy Papers released in 2008. A research study conducted by Professor Ross Garnaut has also been influential in the Scheme's design (Garnaut, 2008).[2] The CPRS will be implemented through the *Carbon Pollution Reduction Scheme Bill 2009* (Cth) (CPRS Bill), which is currently before Federal Parliament. In changes to the CPRS Bill announced on 4 May 2009, the Australian Government has indicated a conditional commitment to reducing GHG emissions to 25 percent below 2000 levels by 2020 if there is a comprehensive global agreement capable of stabilising CO_2 concentrations in the Earth's atmosphere at 450 ppm or lower (DCC, 2009). The CPRS will cover emissions of CO_2, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride GHGs and has broad sectoral coverage. It is expected that the scheme will cover around 75 percent of Australia's emissions and initially impose mandatory obligations on about 1,000 companies. It will cover a broad range of sectors, including stationary energy, transport, industrial processes, synthetic GHGs, fugitive emissions and waste.

[1] Further information on the operation of GGAS can be found at the Independent Pricing and Regulatory Review Tribunal, at: www.greenhousegas.nsw.gov.au/documents/Intro-GGAS.pdf.
[2] These can be downloaded from Australian Government Department of Climate Change, at: http://www.climatechange.gov.au/whitepaper/index.html.

As GGAS is expected to be subsumed into the CPRS, commentary in this section will focus on the CPRS.

3.2.1 Carbon cost pass-through

Carbon cost pass-through has become a sensitive element of the CPRS. Large emitters, including in the coal-fired electricity sector, have sought adjustment compensation from the Australian Government on the basis that their capacity to pass through the costs of complying with their CPRS emission reduction obligations will be limited.

The Australian Government has sought to allay these concerns by including compensation mechanisms in the CPRS Bill. Part 8 provides for free allocations of emission permits to emissions-intensive trade-exposed (EITE) industries, being those whose ability to pass on the costs of complying with the scheme are limited by international competition.

An activity will be "emissions intensive" if it has:

- 1,000 tCO_2-e per million dollars of revenue (tCO_2-e/A$m revenue); or
- 3,000 tCO_2-e per million dollars of value added (tCO_2-e/A$m value added).

"Value added" is not defined in the CPRS Bill or the explanatory memorandum (CPRS EM) which accompanies it. According to the White Paper emissions intensity includes a factor to represent average emissions (from power generation) per unit of electricity used by the activity. Trade exposure will be assessed as whether the activity has a trade share of greater than 10 percent in any one of the years 2004-05 through to 2007-08 or a demonstrated lack of capacity to pass through costs due to the potential for international competition (DCC, 2008: s 12).

"Trade share" is not defined in the CPRS Bill but the White Paper suggests that a sector's trade share will be calculated as the proportion (by value) of total production in the sector comprised by imports and exports in that sector (DCC, 2008: s 12.3.1).

Eligible activities will receive a free allocation of 90 percent or 60 percent of permit acquittal obligations (based on industry average emissions baseline), depending on how emissions-intensive they are. The assistance rate will be 90 percent if the activity has at least:

- 2,000 tCO_2-e per $1m revenue; or
- 6,000 tCO_2-e per $1m value added.

The assistance rate will be 60 percent if the activity has:

- 1,000-1,999 tCO_2-e per $1m revenue; or
- 3,000-5,999 tCO_2-e per $1m value added (CPRS EM, para 4.12).

For the first five years of the CPRS, a 'global recession buffer' will increase the industry average emissions baseline by 5 percent for activities initially receiving 90 percent assistance and by 10 percent for those initially receiving 60 percent assistance. This will increase initial effective rates of assistance to 94.5 percent and 66 percent respectively (CPRS EM, para 4.13).

Part 9 of the CPRS Bill also provides for assistance to be allocated to coal-fired electricity generators. They will receive assistance in the form of a one-off allocation of free permits which will be issued under the Electricity Sector Adjustment Scheme. The permits will be distributed to generators on a

per-output basis (taking into account emissions intensity) in five equal instalments over the first five years of the scheme.

Finally, the CPRS will also include emission permit price caps. In the first year of the scheme liable entities will be able to purchase an unlimited number of emission permits from the Australian Government at the fixed price of A$10 (US$8.12). During this year of the scheme it will in effect operate as a CO_2 tax rather than a trading scheme, as there will be limited incentive to trade in these units.

Further detailed guidance on assistance available to eligible entities under the CPRS can be found at the website of the Australian Government Department of Climate Change.[3]

It is not yet clear what effect the assistance measures included in the CPRS Bill will have on CO_2 cost pass through and, more broadly, on the price of emitting GHGs in Australia. It is likely that, at least in the early stages of the scheme, these mechanisms will reduce the effectiveness of the CPRS as a price signal.

3.2.2 Application of emission reduction obligations

The CPRS Bill does not specify how CCS infrastructure should be treated under the CPRS. However, the position proposed in the White Paper is that carbon that is transferred to CCS facilities not be counted towards the originating entity's gross emissions. However, CPRS obligations for fugitive emissions from carbon capture, transport and storage activities will be imposed on relevant CCS facilities (White Paper; policy position 6.13).

More generally, the CPRS Bill provides that entities in covered sectors which control facilities whose direct (or scope 1) emissions are more than 25,000 tCO_2-e in any given year will be subject to emission reduction obligations. Liable entities may be companies, government entities (including local councils), joint ventures, partnerships, trusts or other unincorporated entities.

The stationary energy, transport, fugitive emissions, industrial processes, synthetic greenhouse gases and landfill waste sectors will be included in the scheme from its commencement. Relevant points of obligation will be as follows:

- large users of fossil fuels will be able to "net out" (purchase without a carbon price) their fuel purchases and directly manage their CPRS obligations;
- for fugitive emissions, direct emitters above a 25,000t CO_2-e threshold will be liable;
- for stationary energy, direct emitters above a 25,000t CO_2-e will be liable, and fuel suppliers are liable in respect of for small emitters;
- for land transport, liability will be imposed upstream, via an excise system; and
- for industrial processes, direct emitters above 25,000t CO_2-e threshold are liable (White Paper, chapter 6).

3.2.3 CCS-specific incentive provisions

The CPRS Bill does not include any specific incentive provisions for CCS facilities such as bonus permit allocations, staged technical goals or other incentives.

[3] http://www.climatechange.gov.au/emissionstrading

3.3 Non-mandatory emission reduction schemes

The voluntary CO_2 market in Australia is relatively small. The Australian Government's Greenhouse Friendly™ standard provides for the accreditation of offsets generated in Australia. To obtain Greenhouse Friendly™ accreditation, offset projects should be:

- additional: abatement generated that is beyond what would be undertaken as part of business-as-usual investment or beyond what is required by regulation;
- permanent: generation of offsets has actually occurred and the CO_2 stored or sequestered will not to be released into the atmosphere in the future;
- measurable: such that the methodologies used to quantify the amount of abatement generated are robust;
- transparent: consumers and other interested stakeholders should be able to examine information on the projects supported on a publicly available website; and
- independently verified: to validate the eligibility of the project and the abatement achieved and to ensure that no conflict of interest occurs.

The Australian Government is developing a national carbon offset standard and released a draft on 19 December 2008 (Australian Government Department of Climate Change, 2009).[4] The purpose of the standard will be to regulate emission reductions occurring outside the CPRS by ensuring minimum standards and establishing verification and validation protocols. The period for public comment on the draft national standard has closed and it is understood that the Australian Government is now considering submissions received.

3.3.1 Acceptance into mandatory cap and trade schemes

Abatement credits such as those of the Greenhouse Friendly™ standard will not be fungible into the CPRS. Current abatement projects under the Greenhouse Friendly™ standard will continue until their conclusion or 1 July 2011 (the date the CPRS is anticipated to commence), whichever occurs first.

3.3.2 Sectoral coverage; inclusion of CCS

It is not yet known whether the proposed offset standard will cover emission reductions achieved through CCS projects. The Australian Government has indicated, however, that CO_2 that is transferred to CCS facilities will not be counted towards the originating entity's gross emissions. However, CCS facilities have not been exempted from emission reduction liabilities. This means that those responsible for CO_2 capture, transport and storage activities will be responsible under the general provisions of the CPRS Bill for any emissions, including fugitive emissions, from these facilities.

3.4 Carbon taxation schemes

The Australian Government has indicated its intention to implement the CPRS rather than a Federal-level CO_2 taxation scheme. The only CO_2 taxation scheme in Australia relates to CO_2 sink forests. Under the *Taxation Laws Amendment (2008 Measures No 2) Act 2008* (Cth), from 1 July 2007 upfront

[4] The draft standard can be downloaded from Australian Government Department of Resources, Energy and Tourism, 'National Carbon Offset Standard', http://www.climatechange.gov.au/carbonoffsetting/ncos/ncos.html

tax deductions can be claimed on costs relating to trees established in CO_2 sink forests until 30 June 2012 for the purpose of CO_2 sequestration.

Under Australian taxation law an upfront tax deduction is allowed for capital expenditure incurred for the sole or dominant purpose of preventing, combating or rectifying pollution of the environment by the taxpayer's business or on the site of that business (*Income Tax Assessment Act 1997* (Cth), ss 40-775, 43-140). To claim the deduction, the taxpayer must be able to prove that the expenditure does not relate to the acquisition of land or for the construction or improvement of buildings or structural works. It is not yet clear whether this provision will apply to large-scale CCS activities. However, as discussed in section 3.2 above, the CPRS will in effect operate as a CO_2 tax in its first year of operation given the A$10 (US$8.12) price cap which will apply in that year.

3.5 Indirect cost imposition: renewable energy schemes

The principal Australian renewable energy scheme is the Australian Government's Mandatory Renewable Energy Target (MRET), which commenced on 1 April 2001 and operates under the *Mandatory Renewable Energy (Electricity) Act 2000* (Cth). The MRET aims to encourage the additional generation of electricity from renewable sources, reduce emissions of GHGs and ensure that renewable energy sources are ecologically sustainable. Under MRET wholesale electricity purchasers are required to purchase an increasing percentage of their electricity from renewables-based generation, such that 9,500 MWh of renewable energy will be generated from 2010. Liable entities can acquire and surrender Renewable Energy Certificates (RECs), each representing one MWh of renewable electricity, to demonstrate compliance. This creates a guaranteed market for renewable energy in Australia. The Victorian Government has introduced a similar target, the Victorian Renewable Energy Target (VRET); the New South Wales Government has considered introducing such a target but has not yet done so.

On 30 April 2009, the Council of Australian Governments agreed upon the design of an expanded National Renewable Energy Target (RET) scheme. The expanded RET scheme passed, as amended on 20 August 2009. The RET will expand the existing MRET and absorb State and Territory renewable energy targets into a single national scheme. The design of the expanded RET aims to implement the Government's commitment that 20 percent of Australia's electricity supply comes from renewable energy sources by 2020, and includes a legislated target of 45 000 gigawatt-hours (GWh) in 2020, which is more than four times larger than the current target. The expanded RET scheme will accelerate uptake and prepare the electricity sector to contribute to the significant emissions reductions that will be needed to address climate change. The RET scheme will operate until 2030, at which time the RET scheme will conclude. By 2030 it is anticipated that CO_2 prices under the proposed CPRS will be sufficiently high to support the growth of renewable energy generation without the RET. By extension, the higher CO_2 price and phase out of RET are also likely to positively affect CCS financing.

3.5.1 Portfolio energy standards

Australia does not have portfolio energy standards.

3.5.2 Feed-in tariffs

Federally, Australia does not have renewable energy feed-in tariffs.

A number of Australian States and Territories, including South Australia, Victoria, Queensland and the Australian Capital Territory, have introduced feed-in tariffs for small scale renewable energy. In most States this is generally limited to small-scale energy generation of up to 30kw. In Victoria, the feed in tariff is limited to households with solar PV systems up to 3.2kw in size.

The Australian Capital Territory feed-in tariff is currently the only "gross" scheme in Australia, i.e. the tariff is payable for all energy created by a generating plant, not just energy exported to the grid. Under all other schemes payments are calculated on a "net" basis.

3.6 Greenhouse gas emission and energy use reporting schemes

The Australian Government has introduced a national GHG emission and energy use reporting scheme which is designed to complement the CPRS by providing the emissions data on which obligations under the CPRS will be based.

The National Greenhouse and Energy Reporting Scheme (NGERS) is implemented through the *National Greenhouse and Energy Reporting Act 2007* (Cth) (NGER Act) and *National Greenhouse and Energy Reporting Regulations 2008* (Cth) (NGER Regulations). The NGER Act and NGER Regulations impose mandatory annual reporting obligations on corporations in control of corporate groups or facilities that emit GHGs (which is defined under the NGER Act to include CO_2), or produce or consume energy, in volumes that exceed the following mandated thresholds:

- a company-level threshold to be phased in during the first three years following the commencement of the legislation, is set at:
  - 125kt of CO_2-e of emissions or 500TJ of energy produced or consumed in the year commencing 1 July 2008;
  - 87.5kt of CO_2-e emissions or 350TJ of energy in the year commencing 1 July 2009; and
  - 50kt of CO_2-e emissions or 200TJ of energy in the year commencing 1 July 2010.
- a facility-level threshold of 25kt of CO_2-e emissions or 100TJ of energy annually applies from the year commencing 1 July 2008.

Companies triggering any of the above thresholds would be required to report on company-wide emissions and energy usage.

As originally enacted the NGER Act did not deal specifically with CCS facilities. However the *Carbon Pollution Reduction Scheme (Consequential Amendment) Bill 2009* (Cth) will amend the NGER Act specifically to include CCS projects in the scheme.

In more general terms, the NGER Act does, however, provide that corporations subject to NGERS reporting obligations may report on activities relating to the reduction of GHG emissions and the removal of GHGs. This would be extended to CO_2 sequestration facilities.

3.7 Evaluation

The CPRS has the potential to make a significant contribution to imposing a cost on carbon in Australia, and hence to enhancing the economic viability of CCS technologies. However, the assistance mechanisms included in the CPRS for EITE entities and coal-fired power generators will reduce the effectiveness of the CPRS as a price signal and could serve to retard short to medium term

investment in CCS technologies and projects. The A$10 (US$8.12) price cap in the first year of the scheme will have a similar effect.

CCS is not dealt with specifically in the CPRS. The inclusion of CCS incentives in the CPRS could provide a significant boost to the attractiveness of investment in CCS technologies.

4. Existing CCS initiatives

4.1 Introduction

Australian jurisdictions have introduced a range of policies and legislation to support CCS technology deployment, particularly in relation to demonstration projects anticipated before 2020.

4.2 Acreage releases

The Federal Minister for Resources and Energy announced on 27 March 2009 the release of ten offshore areas under the jurisdiction of the Australian Government for the exploration of potential GHG storage areas.[5] The releases included:

- three release areas in the Gippsland Basin area off the southeast coast of the state of Victoria;
- two release areas in the Torquay Sub-basin off the southwest coast of Victoria;
- one release area in the Otway Basin area off the southeast coast of South Australia;
- two release areas in the Vlaming Sub-basin off Perth in Western Area; and
- two release areas in the Petrel area off the northwest coast of the Northern Territory.

The releases will be administered under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (discussed below), which provides for a system of access and property rights for the geological storage of GHG in offshore waters under Federal jurisdiction.

In addition, under the *Barrow Island Act 2003* the Western Australian Government has permitted CCS activities to be carried out at the Gorgon liquefied natural gas extraction facility at Barrow Island off the northwest coast of Western Australia.

4.3 Government or government-business research facilities

A number of government and government-business research facilities have been established to undertake CCS research in Australia.

On 16 April 2009 the Prime Minister of Australia launched the Australian Government's Global CCS Institute. Working with others, the Global CCS Institute will facilitate the widespread deployment and implementation of CCS technologies to achieve the G8 objective. The Global CCS Institute has a unique membership model, including government and industry stakeholders, researchers, and non-government organisations from Australia and around the world. Global CCS Institute will support commercial scale CCS projects, with annual funding of up to A$100 million (US$81.2 million).[6]

The Australian Government-funded Cooperative Research Centre for Greenhouse Gas Technologies (CO2CRC) is an unincorporated joint venture which brings together government agencies, research

[5] Details of the acreage releases can be found at Australian Government Department of Resources, Energy and Tourism, 'Carbon Capture and Storage Acreage Releases', http://www.ret.gov.au/resources/carbon_dioxide_capture_and_geological_storage/carbon_capture_and_storage_acreage_release/Pages/default.aspx.

[6] Further information on the Global CCS Institute can be found at the website of the Australian Government Department of Resources, Energy and Tourism, at: http://www.ret.gov.au/resources/gccsi/Pages/default.aspx.

bodies and Federal, State and international government agencies. CO2CRC has a commercial arm, CO2CRC Technologies Pty Ltd (CO2TECH), which commercialises CCS technologies developed by CO2CRC. CO2CRC has led development of the Otway Basin CCS demonstration project in Victoria.[7]

The Centre for Low Emission Technology (cLET) is a partnership between the Queensland Government, CSIRO, Stanwell, Tarong, the Australian Coal Association Research Program and the University of Queensland. It committed A$26 million (US$21 million) to the primary focus of research and development of next-generation low emission technologies with an emphasis on improved gas cleaning, gas separation and gas conditioning technologies.[8] The Centre for Low Emission Technology successfully completed its research program in July 2009, and has subsequently closed.

In addition, the Coal21 Fund (Coal21) is an industry research fund whose purpose is to facilitate research on GHG abatement for coal through research and development and pre-commercial demonstration of low emissions technologies in the power sector. It has been included here because, although an industry fund, it contributes to research projects to which Australian Governments also contribute. Coal21 was established in 2006 by the Australian Coal Association and its activities are funded by a voluntary levy on Australian black coal producers. Coal21 has committed funding to a number of low-emissions projects in Australia, including:

- $68 million (US$55 million) to the Callide Oxyfuel Project in Queensland (with the Australian Government, Queensland and a range of business contributions);
- up to $300 million (US$244 milllion) to the Queensland Integrated Gasification Combined Cycle project (with $300 million from the Queensland Government and other funding); and
- $50 million (US$ 41 million) to post-combustion capture projects in New South Wales (with funding from the Australian Government and New South Wales Governments, and other funders) (Coal21, 2009).

4.4 Government funding

Australian Governments have provided significant funding to CCS-related research and development.

4.4.1 Mapping and data collection and sharing

In conjunction with its March 2009 release of offshore sequestration acreage areas, the Australian Government also released geotechnical data on the acreage released.[9]

State Governments are also funding geotechnical research. For example, the New South Wales Government's New Frontiers initiative will over three years fund several seismic surveys and stratigraphical core hole drilling are being planned to validate the initial findings and fast track and augment the pre-competitive geoscience data acquisition.

The Government of Western Australia has established an Exploration Incentive Scheme, which aims to encourage exploration in Western Australia for the long-term sustainability of the State's resources sector. Its priorities for 2009-10 include a co-funded drilling program which will test sedimentary units that could be used for CO_2 storage. It will also develop an integrated online system allowing

[7] Further information on CO2CRC can be found at: http://www.co2crc.com.au/.

[8] Further information on cLET can be found at: http://www.clet.net/about/our_partners.html

[9] Further information on the acreage releases can be found in Australian Government Department of Resources, Energy and Tourism, *Initial Release of Offshore Areas for Assessment of Greenhouse Gas Storage Sites*, *Guidance Notes for Applicants,* March 2009.

customers to create customised geoscience reports and maps, including new geoscience information relating to the use of geosequestration to store CO_2 emissions (WA DMP, 2009).

The South Australian Government has introduced a Plan for Accelerating Exploration (PACE). It is providing total funding of A$30.9 million (US$25.1 million) over seven years to 2011 to provide industry standard geoscientific information, facilitate land access for exploration, facilitate development of multiple land use policies, and provide enhanced educational resources.

Queensland has introduced the Carbon Geostorage Initiative in the Department of Mines and Energy through Geosciences Queensland which has A$10 million (US$8.12 million) funding to explore prospective sites for CO_2 storage.

4.4.2 Research, development and commercialisation

As discussed in Section 4.3 above, the Australian Government and State Governments in Australia fund a range of research, development and commercialisation activities relating to CCS.

In its 2009-2010 Budget, the Australian Government committed A$2 billion (US$1.62 billion) over nine years to the CCS Flagships Program. Building on the existing National Low Emissions Coal Initiative, the Program will support construction and demonstration of large-scale integrated CCS projects in Australia, with a target of creating 1,000MW of low-emission fossil fuel generation. The CCS Flagships Program will be allocated on the basis of competitive tendering, with the purpose of funding 2-4 industrial scale demonstration projects. In determining the portfolio design for the Program, the Minister for Resources and Energy will be advised by the National Low Emissions Coal Council. It is likely to prioritise multi-user infrastructure and integrated capture and storage.

The Victorian Government has contributed over A$29 million (US$2.5) to the Centre for Energy and Greenhouse Gas Technologies (CEGT) (Victorian DPI, 2009a). CEGT identifies new technologies that require investment to reach the demonstration or commercialisation stage. The Centre, in conjunction with co-investors, aims to generate venture capital grade returns on its investments by meeting the growing Australian and global demand for these technologies.

The Queensland Government has through the Queensland Future Growth Fund committed A$300 million (US$244 million) for clean coal research and development. The Fund is established under the *Future Growth Fund Act 2006* (Qld) and has as its purpose the provision of funding for initiatives or infrastructure benefiting Queensland.

Other government funding for research, development and commercialisation is discussed in Section 4.3 and elsewhere in this Section 4.4.

4.4.3 Technology demonstration and early deployment incentives

As discussed above, the Australian Government and States have funded a number of technology demonstration projects.

4.5 Taxation incentives

Australian Governments have not introduced any CCS-specific taxation incentives.

4.6 Liability for failure to capture

At this stage, Australia has no implemented legislation requiring CO_2 capture or making development or other approvals for fossil-fuel power stations contingent on the installation of CO_2 capture technology.

However, in New South Wales the *NSW Energy Reform Strategy – Defining an Industry Framework,* provides that reform of that State's energy sector may include requirements that new power stations include CCS technology. This would be achieved by making their development consents contingent on the installation of CCS technology (NSW Government, 2009).

Queensland's energy policy, *ClimateSmart 2050* precludes new coal fired power plants without CCS technology under specific conditions (Queensland, 2007).

4.7 Evaluation

The Global CCS Institute has the potential to play a critical role in galvanising international efforts to expand and exploit CCS technologies. Australian Governments have already devoted considerable resources to funding the development of CCS technologies. This has facilitated the production of world-leading CCS research and provides a solid basis for further incentives. State and Federal Governments also have solid track records in collaborating with business to facilitate CCS research and development.

Australian Governments could strengthen their efforts in this area by:

- increasing funding (and/or tax concessions) for CCS technology development;
- further strengthening government-industry research and commercialisation links; and
- expanding inter-jurisdictional cooperation to increase synergies in effort and enhance economies of scale in research and development.

5. Capture of CO_2

5.1 Introduction

With the exception of Western Australia in relation to the Gorgon project, Australian jurisdictions have not yet sought to closely regulate the capture of CO_2. In general terms, the CCS projects which have been commenced in Australia have been permitted under existing, non-CCS specific, legislation or through exemptions to this legislation.

5.2 Integrated policy and legislation

The Western Australian Government passed CO_2 capture legislation to regulate CO_2 capture activities occurring in the context of the Gorgon liquefied natural gas (LNG) project off the northwest of Western Australia.

The *Barrow Island Act 2003* (WA) does not explicitly require the Gorgon joint venture partners to capture CO_2 generated by the project. It does, however, require that they submit to the Western Australian Government management plans for the disposal and injection of CO_2 generated by the project. The Act also provides for the authorisation of CO_2 storage at the project site, including by providing that the Minister responsible for the Act[10] must not approve CO_2 storage in relation to the project without the approval of the Ministers responsible for the *Conservation and Land Management Act 1984* (WA) and the *Land Administration Act 1997* (WA).

The Australian Government, Victoria and Queensland have all passed integrated CCS legislation. Victoria's *Greenhouse Gas Geological Sequestration Act 2008* (Vic) (Victorian GGGS Act) was passed in October 2008 and is the first piece of CO_2 storage legislation with general application to be passed in Australia. The Australian Government's *Offshore Petroleum and Greenhouse Gas Storage Act 2008* (Cth) (Australian Government's GGS Act) was passed in December 2008 and Queensland's *Greenhouse Gas Storage Act 2009* (Qld) was passed in February 2009. At the time of writing, regulations for the three Acts had not yet been passed but the Victorian Department of Primary Industries has released a discussion paper on regulations under the Victorian GGGS Act which indicates that the regulations will be made on or before 1 January 2010, when the Victorian GGGS Act comes into force (Victorian DPI, 2009a).

South Australia is developing its own CO_2 storage legislation, the *Petroleum (Miscellaneous) Amendment Bill 2009* (SA). The Federal, Victorian and Queensland legislation also amended planning, environmental and other legislation in those jurisdictions to provide for CO_2 storage. Because their subject matter focuses primarily on CO_2 storage, rather than CO_2 capture, these Acts are not discussed in detail in this section.

5.3 General policy and legislation with applicability to CO_2 capture

Integrated CCS legislation enacted by the Federal Government and the States of Victoria and Queensland does not explicitly provide for the capture of CO_2. In the absence of such treatment in

[10] Hereafter, any reference to a 'Minister' is a reference to the Federal or State Government Minister administering the relevant act.

these laws, the capture of CO_2 will be dealt with under existing planning and pollution legislation in Australia. The Otway Project in Victoria was an example of a project that was developed under existing planning and pollution laws.

5.3.1 Planning requirements

In the absence of dedicated CCS capture legislation, CO_2 capture in Australia is in general terms governed by State planning and environment laws. These regimes generally require that development of land be consistent with local, regional and/or state-level environmental planning instruments (EPIs). In addition, developments which impact on matters of national environmental significance may be subject to Federal regulation. CO_2 capture obligations could be included in planning consents, such that failure to capture mandated quantities of CO_2 could result in enforcement activities by planning authorities.

In Victoria, the *Planning and Environment Act 1987* (Vic) (Victorian PE Act) sets out planning requirements for development in that State, including planning schemes which must be complied with in development. The Act provides that decisions of Ministers can be exempted from planning schemes. It is understood that the Otway Project was permitted in this way.

In Queensland, the *Integrated Planning Act 1997* (Qld) (Queensland IP Act) provides the framework for that State's planning and development assessment system. The Act provides an Integrated Development Assessment System (IDAS) for development-related assessments by local and state governments. Chapter 3 of the Act provides for a category of development which is "exempt development" and not subject to planning schemes. The Queensland GGS Act amended the Queensland IP Act so that "GHG storage activities" are listed as exempt development. "GHG storage activities" are defined broadly to include "any aspect of development for a GHG storage activity carried out under a GHG authority under the *Greenhouse Gas Storage Act 2009* (Qld)." It is not clear whether this would exempt CO_2 capture activities from local-level permitting requirements. The State Development and Public Works Organisation Act 1971 was amended in late 2006 to facilitate the fast tracking of critical projects and allow for the consolidation of the permitting processes.

At the Federal level, the *Environment Protection and Biodiversity Conservation Act 1997* (Cth) (EPBC Act) provides an integrated environmental assessment and approval process for developments of "national environmental significance." This can include actions in the Australian marine environment (to which the Australian Government's GGS Act applies), together with actions impacting on RAMSAR wetlands of international importance, listed migratory species, World Heritage properties and places listed on the National Heritage List. The EPBC Act provides that where an action is likely to have a "significant impact" on a matter of national environmental significance, the action will require the approval of the Federal Environment Minister.[11] Any such approval would involve an environmental impact assessment. This is not explicitly dealt with in the Australian Government's GGS Act but could apply to permitted activities under that Act. It is also important to note that it has previously been proposed that a "greenhouse trigger" be integrated into the EPBC regime. If enacted, this would add greenhouse to the list of matters of national environmental significance matters.

[11] Further information on criteria for the assessment of significant impacts can be found at: Australian Government Department of Heritage, *EPBC Act Policy Statement 1.1: Significant Impact Guidelines: Matters of National Environmental Significance*, May 2006.

5.3.2 Retrofitting

There are no CCS retrofitting-specific policies or laws in Australia. Retrofitting of existing power plants to add CO_2 capture capability would therefore be governed by relevant planning laws, as discussed above.

5.3.3 Relevant pollution laws and policies

Australia has not developed a uniform approach in determining whether emitted and captured CO_2 should be treated as a pollutant, under pollution legislation, or as a waste, under waste legislation.

In the absence of treatment under integrated sequestration legislation, pollution laws and policies could be adapted to regulate the capture of CO_2. The approaches of Queensland and Western Australia are illustrative here.

In Queensland, the *Environmental Protection Act 1994* (Qld) (Queensland EP Act) provides that causing environmental harm can be prosecuted as a criminal offence attracting criminal penalties of up to 4165 penalty units or 5 years imprisonment, depending on whether the level of the nuisance caused is characterised as being a nuisance, material harm or serious harm. Under section 443, it is an offence to allow a contaminant to be placed in a position where “it could be reasonably expected to cause serious or material harm or environmental nuisance.” A "contaminant" is defined very broadly under the Act, which states that "a contaminant can be…a gas, liquid or solid; or an odour."

The Act also defines "waste" broadly to include a gas, liquid, solid or energy, or a combination of any of them (other than an approved resource) that is:

- left over, or an unwanted by-product, from an industrial, commercial, domestic or other activity; or
- surplus to the industrial, commercial, domestic or other activity generating the waste.

A thing can be waste whether or not it has value and the Minister administering the Act may make "environmental protection policies" about matters including waste management. At the time of publication no CO_2 capture environmental policy had been made.

In Western Australia, sections 50A(2) and 50B(2) of the *Environmental Protection Act 1986* (WA) provide that it is an offence to cause serious or material environmental harm, while section 50(2) provides that it is an offence, punishable by a fine of up to A$250,000 (US$203,000), to cause or allow waste to be placed in a position that could reasonably be expected to gain access to the environment and which would result in pollution.

5.4 Liability for failure to capture

Australian legislation does not currently impose on GHG emitters or sequestration facility operators any direct legal obligation to capture CO_2. However, there are two ways in which the law could indirectly operate in such a way as to have the effect of requiring entities to capture CO_2.

First, an entity may be required to capture CO_2 at or in connection with a facility where CO_2 capture is a condition of a planning consent or other permit or licence granted to that facility. A failure to capture CO_2 at the facility in accordance with the planning consent could lead to criminal or civil sanction. For example, the New South Wales section 76A of the *Environmental Planning and Assessment Act 1979* (NSW) provides that if an environmental planning instrument requires that development be carried out in accordance with a development consent, development must not be carried out on the land to which

the instrument applies except in accordance with a consent obtained and in force under the instrument, and the instrument itself. Section 123 of the Act provides a broad right for "any person" to bring proceedings in the New South Wales Land and Environment Court to restrain breaches of the Act. The effect of these provisions is to require that where CO_2 capture is a condition of a planning consent for development of land in New South Wales, failure to do so in accordance with the consent could expose an operator to enforcement actions in the Land and Environment Court.

GHG emitters or sequestration facility operators could indirectly be incentivised to capture CO_2 through the operation of the CPRS. In its present form, the draft CPRS Bill provides for emission reduction liabilities to be imposed on entities covered by the scheme. This will require such entities to physically reduce their GHG emissions or purchase permits with which to acquit their emission reduction obligations. The CPRS may, however, have the perverse effect of operating to penalise those who control facilities in respect of which CO_2 is captured by requiring owners of these facilities to acquit permits in respect of potential GHG emissions which have actually been avoided. This issue has arisen in respect of the ZeroGen project and is likely also to be relevant to other CCS projects in Australia.

Finally, as discussed above, under NGERS emission reduction and GHG removal projects can be reported on by corporations registered under that scheme. Division 137 of the *Criminal Code Act 1995* (Cth) provides that it is a criminal offence for a person to provide a document to a Australian Government entity when that person knows the document is false or misleading. Information on emission reduction or GHG removal activities reported to the Australian Government under NGERS must not be false or misleading.

It is also important to note that environmental activitists are increasingly seeking to impose capture obligations on emission sources using environmental legislation. Rising Tide, a climate change group, plans to initiate an action in the New South Wales Land and Environment Court against electricity generator Macquarie Generation. The group has argued that at the generator's Bayswater facility in New South Wales it has been negligently disposing of waste by emitting CO_2 into the atmosphere in a manner that has harmed or is likely to harm the environment''. The group argues that this in breach of the *Protection of the Environment Operations Act 1997* (NSW).[12] It is likely that such litigation will become increasingly common in Australia in the future.

5.5 Taxation of CO_2 capture

There are no CO_2 capture-specific taxation regimes in Australia.

5.6 Evaluation

Where no dedicated CCS legislation exists, there is reduced incentive for investment in CO_2 capture technologies. This also limits the benefits provided by the integrated regulation of the transport and sequestration stages of the process.

A further effect of this absence of regulation is to enhance market uncertainty as to whether general planning and pollution legislation might in the future require CO_2 capture in electricity generation facilities. In the context of the long range investment decisions needed to fund CCS operations, it is imperative that this question be resolved.

12

A further gap relates to the potential for the CPRS to require CCS project proponents to acquit permits in respect of potential GHG emissions which have been avoided through the use of CO_2 capture at emission sources.

This policy gap could be addressed through policy or legislation clearly setting out the conditions under which point source GHG emissions should be captured. Such requirements could be imposed sectorally, such that emissions from point sources in certain sectors must be captured, or quantitatively, such that emissions above mandated levels must be captured. This could accelerate deployment of CCS technologies however such policies may not be supported by the current state of CCS technological development.

6. Transport of CO_2

6.1 Introduction

In the areas which fall under the integrated legislative schemes in Victoria, Queensland and nationally, the transport of CO_2 is regulated through both the framework CCS legislation and also separate but linked schemes governing the construction and operation of pipelines. As the majority of CO_2 captured in Australia will likely be transported to sequestration sites by pipeline, this section will focus on pipeline transport. A number of Australian jurisdictions already have pipeline legislation which could be adapted to regulating CCS transport, as has already occurred in Victoria and Queensland.

6.2 Integrated policy and legislation

6.2.1 Licencing of transportation activities

Integrated CCS legislation at the Federal, Queensland, Victoria and Western Australia levels provides for transportation of CO_2 to be regulated in two main, sometimes overlapping, ways:

- through transport-mode specific licencing provisions under transport regulation; and
- through general legislative provisions relating to work programs required to be submitted under these statutes to obtain other permits.

This section deals with the first of these regulatory mechanisms; the second is dealt with in Sections 6.2.2 to 6.2.4 below.

Regulation in respect of road, rail and ship transport is most likely to be relevant at the exploration phase of operations, where it is not yet economic to construct CO_2 pipelines but it is necessary to inject CO_2 into potential storage formations.

PIPELINES

The CCS legislation in Queensland, Victoria and Western Australia regulates CCS pipelines both directly through the framework legislation itself and also through existing pipelines legislation. These legislative schemes require that a pipeline licence must be obtained before CO_2 can be transported through a pipeline.

The Victorian CCS legislation adopts a similar approach, being integrated with the *Pipelines Act 2005* (Vic) (Victorian Pipelines Act), which provides for the licencing of pipelines by the relevant Minister. The Victorian Pipelines Act applies to pipelines for the conveyance of substances including CO_2, or any other pipelines declared subject to the Act by the Minister. Under the Act, it is an offence to construct or operate a pipeline without the approval of the Minister. Notably, the Pipelines Act provides that a pipeline can be exempted from its operation if the Minister considers it to be safe, there is a minimal risk that it will have a substantial impact on the environment, or the Minister considers it otherwise safe to do so. If the Minister does not exempt a pipeline, the application process involves the submission to the Minister of a consultation plan, applications for entry to relevant land, notice to be provided to relevant landowners and Ministers, the referral of a decision to a panel if required, and if necessary, environmental impact assessment.

Queensland has adopted a similar approach to CCS pipeline licencing, with licencing conducted under a separate statute integrated with the GGS Act, the *Petroleum and Gas (Production and Safety) Act 2004* (Qld) (Queensland PG Act). The Act applies to pipelines for transporting substances including "GHG streams," which are defined under the Queensland GGS Act as a "stream of CO_2 or a substance that overwhelmingly consists of CO_2", which must be gaseous or liquid. The Act provides for the grant of pipeline licences over a particular area, or point-to-point licences. To obtain a pipeline licence, a proponent must apply to the Minister administering the Queensland PG Act, including in the application information on the pipeline and a statement of how it proposes to consult owners and occupiers of lands affected by the pipeline.

In Western Australia, the *Barrow Island Act 2003* (WA) integrates "CO_2" into the definition of "petroleum" under the *Petroleum Pipelines Act 1969* (WA), that State's pipelines legislation, in effect extending its application to include CO_2 pipelines. The operation of this provision is not expressed to be confined only to the Gorgon development.

In New South Wales, the construction and operation of pipelines is regulated and such activities require licences under the *Pipelines Act 1967* (NSW). Prior to licencing, the environmental assessment of the pipeline takes place under the *Environmental Planning and Assessment Act 1979* (NSW), however, the pipeline easement acquisition process is conducted under the *Pipelines Act 1967* (NSW). Easements acquired under the Pipelines Act require compensation to be paid in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW).

The definition of "petroleum" under the *Pipelines Act 1967* (NSW) includes CO_2. This is relevant as the *Pipelines Act 1967* (NSW) creates a limited number of exemptions from the need to obtain a licence for certain petroleum activities, including a pipeline for returning petroleum to a nautral reserviour, which may consequently, assist with the transportation of CO_2 for CCS activities. Further, under section 75V of the *Environmental Planning and Assessment Act 1979* (NSW) a licence under the *Pipelines Act 1967* (NSW) cannot be refused if it is necessary for carrying out an approved project under Part 3A (major project approval) of the *Environmental Planning and Assessment Act 1979* (NSW), which may also be relevant to CCS activtities if a CCS project is assessed as a "major project" under Part 3A of that Act.

Neither of the Queensland nor the Victorian legislation clearly distinguishes between treatment of new and existing pipelines. The Federal legislation does distinguish between them, but provides similar penalties for the operation of new or existing pipelines without consents.

Case study: Pipeline licensing under the Australian Government GGS Act

Under Chapter 2 Part 2.2 of the government's GGS Act, the pipeline licensing process consists of four main steps:

- the pipeline proponent must apply to the licence determination authority (the Designated Authority), providing information including details of the pipeline's design and construction process, the proponent's technical qualifications, a layout plan for the pipeline and any agreements the proponent has entered into for the procurement or conveyance of CO_2;
- if the Designated Authority wishes to approve the licence application it will issue to the proponent an "offer document" indicating its intention to do so;
- if the proponent wishes to accept the Designated Authority's offer, the proponent must within between 90 and 180 days after receiving the offer document provide written notification to the Designated Authority requesting that an issuing authority, the Joint Authority issue the licence; and
- the Joint Authority will issue the pipeline licence if notice has been provided in accordance with the Act.

Section 211 of the Act sets out the rights conferred on pipeline licensees. These include the rights, in accordance with any conditions imposed on the grant of the licence, to:

(a) construct in the offshore area specified in the licence a pipeline:

  (i) of the design, construction, size and capacity specified in the licence;

  (ii) along the route specified in the licence; and

  (iii) in the position, in relation to the sea bed, specified in the licence;

(b) construct in the offshore area specified in the licence the pumping stations, tank stations and valve stations specified in the licence in the positions specified in the licence; and

(c) to operate:

  (i) that pipeline; and

  (ii) those pumping stations, tank stations and valve stations; and

(d) carry on such operations, to execute such works and to do all such other things in the offshore area specified in the licence as are necessary for, or incidental to, the construction or operation of:

  (i) that pipeline; and

  (ii) those pumping stations, tank stations and valve stations.

  (i) that pipeline; and

  (ii) those pumping stations, tank stations and valve stations.

ROAD AND RAIL TRANSPORT

The Federal and Victorian CCS legislation do not seek to regulate transportation of CO_2 by road or rail. The Queensland legislation contains notification requirements. Under the Queensland legislation, proponents must notify public road authorities of any "notifiable road use". A "notifiable road use" is defined under the legislation as the movement of more than 50 kilotonnes of CO_2 equivalent in any year on roads controlled by a public road authority.

Otherwise, it is not clear whether Victoria and Queensland road or rail transport legislation regulates road and rail transport of CO_2 as a prescribed waste or dangerous substance. In Queensland, the Environmental Protection Regulation 2008 (Qld) governs transport of waste and hazardous substances. Under this regulation "regulated waste" is subject to transport restrictions. Carbon dioxide is not listed as a regulated waste but the definition includes "commercial or industrial waste, whether or not it has been immobilised." The transport of commercial quantities of restricted waste, or consignments over 250kg in a vehicle, could be subject to restrictions. Under the Regulation, the treatment or disposal of regulated waste could also be subject to restrictions, including permitting and environmental impact assessment requirements.

The Australian National Transport Commission, an inter-governmental agency, has developed the *Australian Code for the Transport of Dangerous Goods by Road and Rail* (Dangerous Goods Code), which a number of States have implemented through legislation and subordinate legislation (for example the Dangerous Goods (Transport by Road or Rail) Regulations 2008 (Vic) in Victoria). The Dangerous Goods Code seeks to regulate transport of dangerous goods by road and rail within Australia and includes lists of goods too dangerous to be transported by road or rail, and other goods in respect of which special handling procedures apply. Carbon dioxide is not listed on either list in the most recent (seventh) edition of the Dangerous Goods Code.

In Victoria, either of the Environment Protection (Prescribed Waste) Regulations 1998 (Vic) or Dangerous Goods (Transport by Road or Rail) Regulations 2008 (Vic) could be adapted to regulate road and rail transport of CO_2. Both provide for licencing of transport in industrial compounds and other waste products but are not expressed to apply to CO_2.

TRANSPORTATION BY SHIP

None of the Federal, Queensland, Victorian nor Western Australian integrated CCS legislation seeks to regulate transportation of CO_2 by ship.

The *Environment Protection (Sea Dumping) Act 1981* (Cth) implements the 1996 Protocol to the *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972* (London Protocol) into Australian law and prohibits dumping of controlled materials at sea. “Controlled material” is defined in the London Protocol. As discussed elsewhere in this Report, the London Protocol was recently amended to make clear that CO_2 could be stored in the sea bed. However, there remains a recognised issue around the transboundary transport of CO_2 prior to injection as Article 6 of the London Protocol currently prohibits the export of wastes or other matter to other countries for dumping or incineration at sea. Similar legislation has been implemented by the States to regulate the dumping of waste in State waters.

6.2.2 Planning

Planning permission for CO_2 transport operations is dealt with under either:

- transportation mode-specific regulation; or

- mainstream environment and planning regulation.

As discussed above, a number of Australian jurisdictions have legislation dedicated to the licencing of pipeline operations. In some cases, the grant of a pipeline licence enables a developer to be exempted from the provisions of relevant planning laws.

In Victoria, if a pipeline licence is issued under the Victorian Pipelines Act, the pipeline will be exempt from the provisions of the State's main planning instrument, the *Planning and Environment Act 1987* (Vic). In Queensland, as discussed in Section 5.3.1 above, development is governed primarily by the Queensland IP Act. The wording of the Act suggests that a separate planning approval may not be required in respect of a pipeline if the pipeline operator is also the holder of a GHG authority under the Queensland GGS Act, however this is not made explicit in the legislation.

In Western Australia, the *Petroleum Pipelines Act 1969* (WA) provides that in assessing a pipeline licence application the Minister administering that Act must have regard to whether the grant of the licence would contravene Western Australian planning legislation. The Act does not specify whether the grant of a pipeline licence exempts a pipeline from the need to obtain planning consent.

The CCS and pipelines legislation provides limited guidance on environmental impact assessment requirements for CO_2 pipelines.

If a proposed pipeline affects a matter of national significance and the Federal Minister for Environment and Heritage considers the pipeline requires assessment, the Minister may order an environmental impact assessment to be conducted under the EPBC Act under the process outlined in Section 5.3.1.

In Victoria, the *Environmental Effects Act 1978* (Vic) governs the preparation of environmental impact assessments, or "Environmental Effects Statements" (EES) as defined under that Act. Under the Act, the Minister for Planning has discretion to determine whether an EES is required in respect of, relevantly, public works, any Ministerial decision or action, or any decision by a person or body under Victorian law. If the Planning Minister determines that an EES is required, the responsibility for preparing it lies with the project proponent. Once an EES is prepared, it is publicly displayed and no work can proceed on the development until the Minister has assessed the EES. Even where an EES is not required, an EIS may still be required under the *Environmental Protection Act 1970* (Vic).

In Queensland, if a pipeline or other development is likely to cause significant environmental harm an environmental impact assessment may be required. The Queensland PG Act makes the grant of GHG pipeline licences conditional upon the issuance of a relevant environmental authority. "Relevant environmental authority" is defined with reference to petroleum authorities rather than GHG authorities, however it appears that the intention of the drafters of the Act was to require pipeline licence proponents to hold an authority granted under the Queensland EP Act. Chapter 5A of that Act distinguishes between level 1 and level 2 environmental authorities. Level 1 authorities are issued in respect of activities with potential to cause significant environmental harm. They require the submission of an Environment Management Plan and usually require the proponent to undertake an environmental impact assessment. Level 2 authorities are issued in respect of activities which have a low risk of environmental harm and usually code with relevant codes of environmental compliance.

In South Australia, the *Petroleum (Miscellaneous) Amendment Bill 2009* (SA), which will amend that State's petroleum and planning legislation, will require a pipeline licencee to carry out a "fitness for purpose" assessment of facilities operated on pipeline land to assess risks including in relation to the environment.

STAKEHOLDER ENGAGEMENT

Most existing Australian CCS legislation provides extensive stakeholder engagement mechanisms in respect of pipeline licence applications. The focus of pipelines legislation is on providing for consultations to manage competing uses of pipeline land, while the focus of environment and planning legislation is generally on reflecting civil society views on proposed developments in permitting decisions.

Federally, the Australian Government's GGS Act requires that details of applications for pipeline licences be published. Under the EPBC Act, if a pipeline proponent was to refer details of their proposal to the Federal Minister, the proposal would be released for public comment and comments received would be taken into account in the Minister's decision.

The Victorian and Queensland Pipelines Act require that a pipeline licence applicant must provide notice of its application to owners and occupiers of lands to which the application relates.

In addition, environmental legislation in both Victoria and Queensland provides for community consultation in environmental authority decisions. The Queensland EP Act provides that it is to be administered "as far as practicable, in consultation with, and having regard to the views and interests of, industry, Aborigines and Torres Strait Islanders under Aboriginal tradition and Island custom, interested groups and persons and the community generally."

6.2.3 Access / tenure

NATURE OF PROPERTY INTERESTS CONFERRED

Australian CCS and pipelines regulation does not of itself generally confer on pipeline licence holders ownership interests in the land the subject of the pipeline licence. Rather, where a pipeline proponent does not own the land upon which a pipeline is to be constructed, the proponent must usually have separately secured interests in pipeline land as a condition of the pipeline licence grant. (This is discussed further in Section 6.2.3.4 below.) In Australia, a pipeline licence generally confers on the holder conditional rights to enter properties the subject of the licence, and to construct, operate and maintain pipelines on those lands. Such rights can include the following:

- to construct a pipeline on pipeline land, but only along a route specified in the plan approved with the pipeline licence, including authorised lateral deviation limits;
- to operate and maintain the pipeline in accordance with a submitted operations plan and any licence conditions imposed with the grant of the licence; and
- in an emergency situation, for the licencee or any person employed or authorised by it to enter any private or public land to repair a pipeline or damage caused to the natural environment as a result of any incident involving a pipeline.

In addition, pipelines legislation in several States (including South Australia and Victoria) provides that a person who proposes to apply for a pipeline licence may apply to the relevant Minister for permission to enter any land for the purpose of making surveys and preliminary investigations in respect of the construction of the pipeline to which the licence would relate. In Victoria this right is conditional upon the potential applicant having attempted to obtain the consent of relevant landowners or occupiers to the entry onto the land and the Minister being satisfied by the adequacy of measures taken or proposed by the potential applicant to address the adverse impacts of their entry onto the land.

ESTABLISHING PRIORITY BETWEEN TRANSPORT AND EXISTING USES AND RIGHTS

Australian jurisdictions have followed a number of approaches in establishing priority between transport and existing uses of land, principally in relation to pipelines. These generally centre on pipeline activities being subject to the consent of other interest-holders.

Under the Australian Government's GGS Act, where land is subject to an existing petroleum or GHG injection licence and a person other than the existing licencee applies for a pipeline licence in a petroleum production licence area, the existing petroleum licencee has the right to request that a pipeline licence not be granted.

Pipelines legislation in Australia also provides that consents be obtained from other users of land adjacent to or subject to a pipeline licence where a pipeline is to be constructed:

- along a railway line or land reserved for railway purposes (under the Victorian Pipelines Act the licencee must at their own expense construct the pipeline to the satisfaction of relevant railway authorities);
- along the route of, or across, a road, in which case its construction must be to the satisfaction of relevant authorities;
- along the route of, or across, electrical transmission lines or another pipeline, in which case the consent of the owners of such facilities must be obtained;
- in or adjacent to land the subject of a licenced petroleum activity, in which case the pipeline must only be constructed with the consent of the interest-holder relevant to that other activity or in the absence of objection from that other interest-holder; and
- over land the subject of a mining lease, in which case the pipeline may only be constructed with the consent of the mining leaseholder.

Most pipeline regulatory regimes in Australia limit the ability of relevant approval authorities or Ministers to approve pipeline activities in or adjacent to national parks and wilderness areas.

RIGHTS OF INDIGENOUS PEOPLES AND OTHER CUSTOMARY RIGHTS

In Australia, enjoyment of property rights will often be subject to the provisions of Federal and State native title legislation. Native title refers to rights held by indigenous Australians over their traditional lands and waters. Australian law provides protections to native title holders and claimants where a government proposes to take certain actions (for example, the grant of a licence or approval) which may affect native title. These protections are provided by the Australian Government's *Native Title Act 1993* (Cth) and similar State and Territory legislation and typically require that certain procedural steps such as notification and consultation be observed prior to the action being done. The Federal legislation provides for the negotiation of Indigenous Land Use Agreements, voluntary agreements between native title groups and other entities for the use of land subject to native title.

There is also legislation at the State and Federal level aimed at protecting indigenous cultural heritage. The principal underpinning this legislation is that Aboriginal cultural heritage should be protected by Aboriginal people with links to that heritage. For example, at the Federal level, the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* seeks to preserve and protect from injury or desecration of areas and objects in Australia and in Australian waters that are of particular significance to Aboriginals in accordance with Aboriginal tradition.

In many situations surveys are required prior to large development works or high impact activities in culturally sensitive landscapes, as it is recognised that these works can cause significant harm to Aboriginal cultural heritage. For example, in Victoria the *Aboriginal Heritage Act* 2006 prescribes, in regulations, the circumstances in which a *Cultural Heritage Management Plan* will be required.

These principals are reaffirmed in the Australian CCS and pipelines legislation. For example, the Queensland PG Act provides that in the application of the legislation to areas where native title exists, native title holders, as defined under the Australian Government's native title legislation, have the procedural and other rights that they have under that legislation and that the relevant Minister must not grant a survey licence unless he or she is satisfied that any relevant provisions of the Australian Government's native title legislation have been followed. The practical effect of this is to require that where native title exists, the holder of a pipeline licence must have the permission of the native title holders to enter the land to construct or operate a pipeline. Similarly, under the Victorian legislation native title holders must have consented to entries on to land for the purposes of pipeline activities, even where those activities have been authorised by the relevant Minister.

COMPULSORY ACQUISITION AND COMPENSATION REGIMES

The general approach to compulsory acquisition and compensation regimes for pipelines in Australia is that:

- where a pipeline licence proponent requires an easement over private land for the construction or operation of a pipeline, the proponent must use all reasonable efforts to reach agreement with relevant landowners for the acquisition of interests in the land;
- where a proponent has despite using all reasonable efforts not been able to reach agreement with landowners for the acquisition of interests in their land, the proponent can apply to the Minister administering the relevant legislation for compulsory acquisition of the interest from the landowner;
- in some cases landowners have the opportunity to comment on a proposed compulsory acquisition; and
- if a Minister grants a compulsory acquisition request, the right of the landowner to deal in the land will usually be restricted and compensation will usually be payable to the landowner by the pipeline licencee.

The Victorian Pipelines Act provides an example. Part 6 of the Act provides a robust regime for the compensation of land owners and occupiers for the use of their land for CCS activities. Under the Act, a Minister may not issue a pipeline licence until, inter alia, any necessary land interests for the pipeline have been acquired by agreement with the landowners or compulsorily acquired. In either case, relevant compensation in connection with the acquisition must have been paid before the licence can be issued. The legislation provides that a proponent or pipeline licencee can apply to the Minister for consent to compulsorily acquire an easement over private land for the purposes of constructing and operating a pipeline. If a proponent applies for an easement, the landowner must be given notice of the application and cannot deal with the land during the period of the notice, except to discharge a mortgage. The *Land Acquisition and Compensation Act 1986* (Vic) then applies and Part 3 of that Act gives the landowner the right to receive compensation for the acquisition, calculated with reference to market prices for the land.

The Victorian Pipelines Act also provides for "rehabilitation bonds" to be payable by pipeline licencees in respect of their activities. Part 10 prohibits a pipeline licencee from constructing a pipeline unless

the licencee has obtained a rehabilitation bond acceptable to the relevant Minister and for an amount specified by the Minister. This also applies to the cancellation or surrender of a pipeline licence. A rehabilitation bond is defined under the legislation to be an instrument securing the payment of a specified amount of money for any rehabilitation work, clean up work or pollution or prevention work that may be necessary as a result of the construction of a pipeline or its decommissioning or removal. The Minister may increase the amount of a bond if the amount is believed to be insufficient. The bond is to be returned if the relevant land is rehabilitated as required.

6.2.4 Environmental and other risks

As discussed in Section 5.3.3 above, there is no uniform Australian approach to whether captured CO_2 should be treated as a pollutant or a waste. In any case, it is likely that the pollution laws discussed in that section would apply to leakages of CO_2 from pipelines.

As in the case of CO_2 storage legislation, Federal and State level occupational health and safety laws apply to activities in those jurisdictions. These laws require that health and safety assessments be carried out in respect of such activities and also provide health and safety principles governing the health and safety policies of businesses to which the legislation applies.

It is likely that most risks posed by pipelines to threatened, endangered or migratory species would trigger environmental impact assessment under the EPBC Act, or that they would trigger assessments under relevant legislation in each jurisdiction.

6.3 Taxation of CO_2 transport

Australia has not introduced CCS-specific transport taxation.

6.4 Evaluation

Dedicated CO_2 storage legislation at the Federal, Victorian and Queensland level is generally either comprehensive in its approach to regulating pipelines or well-integrated with existing petroleum and gas pipelines legislation. This provides certainty for market participants and should also reduce compliance costs for market participants already experienced in complying with existing pipelines legislation in the context of petroleum or gas activities. Further certainty is expected to be provided once detailed regulations are put in place to support the legislation.

Each of the three dedicated CO_2 storage regimes also provides for rigorous consultation mechanisms. This may in the short term have the effect of increasing the complexity and cost associated with permitting for CO_2 pipelines but in the long term will help to increase public confidence in and support for CCS projects by facilitating transparency.

In contrast to the robust pipeline transport legislative schemes, significant regulatory gaps exist in relation to non-pipeline transport of CO_2, in particular when that transport is across State boundaries. Regulation of transport by road, rail and ship remains fragmentary. This will increase administrative costs for market participants and also decrease certainty. This problem is likely to be particularly acute during the early stages of CCS project development in Australia, when project developers are unlikely to need to transport CO_2 in sufficiently large quantities to justify investments in pipelines. Only small quantities of CO_2 may be transported during this phase of the technology's development in Australia. Australian jurisdictions should integrate non-pipeline transport of CO_2 into their CO_2 storage legislation in the same way that pipeline transport has been integrated.

7. Exploration of potential CO_2 storage sites

7.1 Introduction

Australia has been active in developing guidelines and best-practice policy settings for CCS. Two policy publications by Federal-State ministerial councils have been, or are likely to be, influential in permitting for CO_2 injection activities. The Ministerial Council on Mineral and Petroleum Resources published in 2005 *Carbon Dioxide Capture and Geological Storage: Australian Regulatory Guiding Principles.*[13] The Environment Protection and Heritage Council and the Ministerial Council on Mineral and Petroleum Resources released in 2009 the *Environmental Guidelines for Carbon Dioxide Capture and Geological Storage*, which include environmental guidelines for CCS projects. These principles have found expression in the Federal, Victorian and Queensland CO_2 storage legislation.

Dedicated legislative frameworks governing exploration of potential CO_2 storage sites have been implemented Federally and in Victoria and Queensland. In general terms, these frameworks are similar to petroleum and gas exploration permitting regimes in these jurisdictions, which provide for fixed-term permitting of exploration of defined blocks of land or seabed.

In Western Australia, the Barrow Island Act is not expressed to regulate exploration for sequestration sites within the Gorgon project area or elsewhere in Western Australia. It does, however, appear to contemplate such exploration as it requires that detailed technical information on storage sites be submitted with any application for approval for CO_2 injection activities.

In South Australia, amendments considered to the *Petroleum Act 2000* (SA), through the *Petroleum (Miscellaneous) Amendment Bill 2009* (SA), would provide for the grant of gas storage exploration licences.

This section will focus on the Federal, Victorian and Queensland legislation. The commentary refers generally to "exploration permits" when referring to exploration licences in general and jurisdiction-specific nomenclature where this is dictated by the context.

7.2 Integrated policy and legislation

7.2.1 Exploration licencing

The Federal and Victorian legislation make it an offence to explore for CO_2 storage sites without authorisation. The Queensland legislation does not specify that to do so would be an offence but this is implied in the permitting regime for which it provides. In these jurisdictions CO_2 storage exploration is licenced for exploration licencing under the following process:

- a call for tenders for a potential acreage release;
- applications for exploration permits (on the basis of work-bid or cash-bid tenders); and
- issuance of exploration permits.

[13] Available from the website of the Australian Government Department of Resources, Energy and Tourism: http://www.ret.gov.au/resources/Documents/ccs/CCS_Aust_Regulatory_Guiding_Principles.pdf.

The conduct of activities contemplated under exploration permits, particularly in relation to injection testing, is generally subject to separate, subsidiary permitting requirements.

In addition, permits can also be obtained for specified activities in respect of which an exploration permit is not necessary. Under the Australian Government's GGS Act, these additional exploration-related permits include GHG search authorities, GHG holding leases and GHG special authorities.

APPLICATION CRITERIA

Under the Australian Government's GGS Act, the main form of exploration permit is a GHG assessment permit, dealt with under Part 3.2 of the Act. Such permits can be issued following either a cash-bid or work-bid process. The information to be provided with applications through each of the two processes is set out in Table 7-1.

Table 7-1 Information to be provided with work-bid and cash-bid greenhouse gas assessment permit applications under the Australian Government's GGS Act

	Work-bid	Cash-bid
Information to be provided	• the applicant's proposals for work and expenditure in relation to the block or blocks specified in the application; • the technical qualifications of the applicant and of the applicant's employees; • the technical advice available to the applicant; and • the financial resources available to the applicant. (section 296)	• the technical qualifications of the applicant and of the applicant's employees; • the technical advice available to the applicant; • the financial resources available to the applicant; and • the amount that the applicant would be prepared to pay for the grant of the permit. (section 303)
Key assessment criteria	• "most deserving", with regard to published criteria including criteria relating to economic, commercial and public interest matters. (section 299)	• highest unrejected bid offered • Minister may reject bids at his or her discretion. (section 306)

The Queensland GGS Act also requires that exploration permits be granted on the basis of competitive tenders but does not provide for cash-bid tenders and requires that relatively more detail be provided by applicants on their exploration plans. Applications for GHG permits will be assessed on the basis of the information provided to the Minister, including the following:

- a statement about how and when the tenderer proposes to consult with relevant landowners and occupiers;
- a proposed work program; and

- an independent statement verifying that the tenderer has the ability and financial and technical resources to carry out the proposed exploration activities.

The effect of the second criterion above is that the exploration plans of applicants for exploration permits in lands covered by the Queensland legislation must be relatively more advanced in order to be able to apply for an exploration permit under the Queensland legislation than would be necessary under the Federal scheme. This is also the case in Victoria, where the Victorian GGGS Act requires that an exploration permit application include, relevantly, a proposed work program for the permit area.

RIGHTS CONFERRED BY EXPLORATION LICENCE

In general terms, the Federal, Victorian and Queensland legislation confers on the holder of an exploration licence the right to:

- explore for potential CO_2 storage sites;
- evaluate the feasibility of injecting in such sites; and
- carry out activities incidental to exploration, including constructing or operating infrastructure needed for exploration.

These rights can be subject to conditions imposed by permitting authorities or Ministers. Under these schemes it is also necessary to obtain separate approvals to undertake the specified exploration activities contemplated in permits, notably the injection of GHG or other substances into potential storage formations.

The Australian Government's GGS Act authorises a GHG assessment permittee to, in accordance with conditions imposed on the permit:

- explore in the permit area for a potential GHG storage formation;
- explore in the permit area for a potential GHG injection site;
- on an appraisal basis, inject and store GHG substances, air, petroleum or water in wells situated within the permit area;
- with the consent of the relevant Federal Minister, recover petroleum for appraisal that was discovered as an incidental consequence of the exercise of the exploration and injection rights above; and
- carry on such operations, and execute such works, in the permit area as a necessary for those purposes.

Petroleum recovered through the exercise of a GHG assessment permit does not become the property of the licencee. The Act does not specify who such petroleum would belong to.

A GHG holding lease (see below) provides similar rights to a GHG assessment permit, with similar conditions.

In addition, a GHG search authority does not permit an authority holder to make a well but does permit them to carry out specified exploration activities.

A similar approach has been adopted in Queensland, but with a more generally expressed set of rights and a slightly different qualifications to rights to conduct incidental activities. The Queensland GGS Act provides that a storage licence holder (referred to as a "GHG permit holder" under this legislation) may carry out the following activities in the permit area:

- GHG storage exploration; and
- evaluating the feasibility of GHG stream storage, including for example, by GHG storage injection testing.

GHG permit holders may also carry out "incidental activities", which are defined as "any activity… in the permit's area if carrying it out is reasonably necessary for or is incidental to GHG storage exploration." Examples given in the Act of incidental activities are:

- constructing or operating facilities, plant or works, including for example, communication systems, compressors, powerlines, pumping stations, reservoirs, roads, evaporation or storage ponds; and
- constructing or using temporary structures or structures of an industrial or technical nature, including for example, mobile and temporary camps and tanks.

The Act limits incidental activities, providing that "constructing or using a structure other than a temporary structure, for office or residential accommodation is not an incidental activity."

PERMITTING OF SPECIFIED EXPLORATION ACTIVITIES

In the Federal, Victorian and Queensland jurisdictions further permits are required before exploration permit holders can undertake key exploration activities in a permit area.

Under the Australian Government's GGS Act, the exercise of a GHG assessment permit will be subject to a number of limitations, notably the necessity to obtain separate consents to undertake specified activities. These are defined to include the permittee complying with notices from the Minister; conditions imposed specifically in relation to work-bid and cash-bid GHG permits; and a requirement that the permittee obtain and comply with the consent of the Minister for "key GHG operations" under the permit.

Key GHG operations are defined under the Act to include:

- operations to make wells;
- on an appraisal basis, injection and storage in a formation of GHG substances, air, water or petroleum;
- seismic surveys;
- monitoring operations;
- baseline investigations; and
- operations to take seabed or subsoil samples.

INJECTION TESTING PLANS

In Victoria and Queensland injection testing plans in connection with exploration permits must be approved by the relevant Minister before injection testing can be carried out in an exploration permit area (Victorian GGGS Act and Queensland GGS Act).

The Victorian legislation provides an example of what assessment criteria are applied in assessing such plans. Under the Victorian GGGS Act a proposed injection testing plan must include:

- details of the liquid or gas to be injected;

- risks to public health or the environment posed by the injection and how such risks are to be prevented;
- a plan for monitoring and verification of the proposed injected material ("monitoring and verification plan");
- a risk management plan; and
- information on the potential leakage and migration path of the injected material.

The Minister can only approve an injection testing plan if he or she is satisfied that the proposed injection testing:

- will not present a risk to public health or the environment (see below); and
- will not present a significant risk of contaminating or sterilising other resources.

Similar approaches are adopted under the Federal and Queensland legislation.

HOLDING LEASES

Under the Australian Government's GGS Act, where a greater level of security over a potential storage formation is required than that afforded by a GHG assessment permit, a greenhouse holding lease, dealt with in Part 3.3 of the Australian Government's GGS Act, can be sought. Such leases can be granted to holders of GHG assessment permits; holders of GHG injection licences where no GHG injection or permanent storage operations have been carried out; unsuccessful GHG injection licence applicants; and holders of petroleum retention leases. The main eligibility criteria for such leases are that:

- an identified GHG storage formation has been identified and is wholly situated in the lease area; and
- the applicant is not currently in a position to inject and permanently store a GHG substance in the formation but is likely to be in a position to do so within 15 years.

The key criterion for the issue of a GHG search authority is that the block in respect of which the authority is sought is not already subject to a GHG assessment permit, GHG holding licence, GHG injection licence or petroleum exploration permit, retention lease or production licence.

LICENCE TERM

The exploration permits provided for under the Australian Government's GGS Act have the following terms:

- GHG assessment permit: 6 years;
- GHG search authority: the period specified in the authority, which must be less than 180 days;
- GHG holding lease: 5 years.

In contrast, under the Queensland GGS Act the nominal term of a GHG permit is the length of the work program submitted with the application, with a maximum period of twelve years. In addition, each 4 years during the period of a GHG permit part of the permit area must be relinquished and a permit will end if the whole of the permit area has been relinquished.

CHALLENGING LICENCES

The legislation at the Federal, Victorian and Queensland level provide broad rights to appeal licencing decisions. Under the Australian Government's GGS Act, any person affected by the decision of a delegate of the Federal Minister may appeal the decision to the Minister. Ministerial decisions can be reviewed in the Administrative Appeals Tribunal, which provides independent review of a range of administrative decisions made by the Australian Government.[14]

In Victoria and Queensland, permitting decisions can also be reviewed. For example, under the Queensland GGS Act persons whose interests are affected by a exploration permit decision (and a range of other reviewable decisions) may appeal the decision in the Land Court. A person entitled to be given information about a decision is taken to be a person whose interests are affected by it.

7.2.2 Access / tenure

LEGAL ACCESS TO AND USE OF DEEP GEOLOGICAL FORMATIONS FOR SEQUESTRATION

In general terms, at common law there is a presumption that a landowner owns everything on or below the surface of their land, subject to exceptions for some minerals. In many states this common law right has been narrowed so that ownership in minerals beneath privately owned land is reserved for the state. Victoria and Queensland have taken this approach, though in slightly different ways.

In Victoria, the Crown owns all underground geological storage formations below the surface of any lands, to the extent that the formation is deeper than 15.24 metres below the surface of the land (Victorian GGGS Act). Under the Victorian legislation, the Crown retains Crown land rights in respect of any residual underground geological formation not already dealt with in a grant, lease, licence or other tenure.

In Queensland the state's ownership of storage formations is not subject to any such limitation. Under the Greenhouse Gas Storage Act the state asserts ownership over all underground storage formations, irrespective of their depth and irrespective of any other legislation, grant, title or other document in force at the commencement of the Act.

NATURE OF PROPERTY INTERESTS CONFERRED

Each of the exploration permit types outlined in Section 7.2.1 above provides limited rights to access and use lands and areas of seafloor.

With the exception of GHG search authorities issued under the Australian Government's GGS Act, exploration permits are exclusive. Conducting the activities countenanced in them is conditional upon obtaining additional, activity-specific permits.

Under the Australian Government's GGS Act, GHG search authorities only provide non-exclusive access rights. Multiple authorities can be granted over a single block.

[14] See Administrative Appeals Tr bunal, www.aat.gov.au.

ESTABLISHING PRIORITY BETWEEN EXPLORATION AND EXISTING USES AND RIGHTS

All three legislative schemes provide for the establishment of priority between exploration and existing uses and rights.

The Australian Government's GGS Act provides three main mechanisms to establish priority between exploration and existing uses.

Under the Australian Government's GGS Act requires all permit holders to ensure that they carry on activities provided for under the Act in a way that the activities do not interfere with navigation, fishing, the conservation of the resources of the sea and seabed, or any other activities being lawfully carried on by way of exploration for, recovery of or conveyance of a mineral (other than petroleum) or construction or operation of a pipeline; or the enjoyment of native title rights and interests.

In addition, in determining an application by a GHG assessment permit to carry out a key GHG operation in a permit area, the Minister must have regard to the impact that the activity will have on petroleum recovery operations that are being or could be carried out under existing or future petroleum permits. If the Minister is satisfied that there is a significant risk of a significant adverse impact on petroleum exploration or recovery operations, the Minister must have regard to the terms of any agreement between the GHG assessment permit holder and the holder of the relevant petroleum permit. The Minister must have regard to the public interest in making assessing such applications. Finally, the Minister must not issue approval for a key GHG operation if there is a significant risk that it will have a significant adverse impact on petroleum extraction operations and the applicant does not hold the title to the petroleum extraction permit, unless the petroleum permit holder has agreed to the carrying out of the key GHG operations.

Furthermore, under the Act the Federal Minister may give GHG injection licencees directions to protect geological formations containing petroleum, even where these formations are outside of the licence area.

In Victoria, a similar approach is taken to the grant of injection licences, except that the key assessment criterion under the Victorian GGGS Act is whether the proposed injection would contaminate or sterilise other resources. If this is likely, the applicant must take all reasonable steps to obtain the consent of any holders of permits or rights in relation to those resources. That Minister may refer injection a proposed injection testing plan to an independent panel for assessment.

SUBSEQUENT USES

As outlined above, the Australian Government's GGS Act provides that if the grant of approval for the carrying out of key GHG operations would affect existing or future petroleum extraction activities the Minister must have regard to the significance of that risk and the terms of any agreement between the GHG assessment permit holder and a petroleum permit holder.

As discussed in Section 7.2.1 above, the Victorian GGGS Act places limitations on exploration activities which could impact on the future use of petroleum resources.

RIGHTS OF INDIGENOUS PEOPLES AND OTHER CUSTOMARY RIGHTS

This is dealt with in Section 6.2.3 above.

COMPULSORY ACQUISITION AND COMPENSATION REGIMES

Under the Australian Government's GGS Act the Australian Government is liable to pay reasonable compensation to a person if the operation of the Act or the regulations would result in an acquisition of property from that person on other than just terms. If the Australian Government and the person do not agree on the amount of the compensation the person may institute proceedings in the Federal Court. This provision is reflective of paragraph 52(xxxi) of the Australian Constitution, which provides that Federal Parliament has the power to make laws "for the acquisition of property on just terms… for any purpose in respect of which the Parliament has the power to make laws."

In Victoria compensation is payable by the holder of an injection and monitoring licence to any holder of a resource authority for any loss or damage that has been or will be sustained in relation to the land or resource as "a direct, natural and reasonable consequence of the carrying out of any activity under the injection and monitoring plan", including for:

- deprivation of access to the resource; and
- loss of opportunity to recover or use the resource (Victorian GGGS Act).

If the Minister approves an injection testing plan the proponent must not carry out work unless a compensation agreement is in place or the Victorian Civil and Administrative Tribunal has approved determined the amount of compensation payable.

Case study: Compensation under the Queensland GGS Act

Part 10 of the Queensland GGS Act contains general compensation provisions which would apply to compensable events arising from exploration activities. Section 319 imposes a general liability on holders of greenhouse authorities (which includes greenhouse permit holders) to compensate:

- each owner or occupier of private or public land that is in the area of, or is access land for, the GHG authority, for:

(a) any compensatable effect the eligible claimant suffers that are caused by:

(i) authorised activities for the GHG authority carried out by or for its holder;

(ii) the carrying out of an activity by a person authorised by the holder if the holder has represented that the activity is an authorised activity for the GHG authority; and

(b) consequential damages the eligible claimant incurs because of a compensatable effect caused by authorised activities for the GHG authority.

A "compensatable effect" is defined under section 319(5) to mean all or any of the following relating to the eligible claimant's land:

(a) deprivation of possession of its surface;

(b) diminution of its value;

(c) diminution of the use made or that may be made of the land or any improvement on it;

(d) severance of any part of the land from other parts of the land or from other land that the eligible claimant owns;

(e) any cost or loss arising from the carrying out of activities under the GHG authority on the land.

The Act also provides that the greenhouse gas authority holder and the eligible claimant may enter into a compensation agreement, which could provide for either or both of monetary and non-monetary compensation (section 320). Under sections 321 and 322 the Land Court may decide and review compensation amounts and agreements. GHG authority holders may not enter into private land to carry out an authorised activity unless, relevantly, where necessary, each eligible claimant is a party to a compensation agreement with the proponent or has agreed to defer the execution of such an agreement (section 324). The Act also provides that compensation agreements run with the land (section 325).

7.2.3 Planning and construction regulation applicable to carbon sequestration facilities

In Australia, planning approvals are generally dealt with at State and local levels. Exploration operations on private lands would be required to local planning codes and would likely be limited to areas zoned for industrial development.

The Federal, Victorian and Queensland Governments have adopted different approaches to managing the interaction between CCS and planning legislation.

In Victoria, sequestration activities can be exempted from planning approval. The Victorian GGGS Act provides that the holder of an injection and monitoring licence may be granted a permit under a planning scheme to carry out operations in the licence area notwithstanding that the planning scheme may prohibit such activities. A "planning scheme" is defined as a scheme approved under Victoria's framework planning legislation, the *Planning and Environment Act 1987* (Vic). However, such activities may be subject to EES requirements under the *Environmental Effects Act 1978* (Vic), as discussed in Section 6.2.

In Queensland, the Queensland GGS Act is not expressed to exempt sequestration activities from planning approval. Some elements of the exploration activities will still require approval through planning processes under the Queensland EP Act (as discussed in Section 6.2). It may be possible for project proponents to seek "significant project" status under the *State Development and Public Works Organisation Act 1971* (Qld), which allows for consolidation of permitting processes.

The regulations to the Victorian and Queensland legislation are likely to refine the relationship between the legislative schemes and the planning legislation in each State.

ZONING

As for CO_2 capture and transport activities, CO_2 storage facilities would be subject to zoning requirements set by State and local governments, except to the extent that exemptions are obtained. It may be that CCS-specific zoning instruments will need to be developed to adequately accommodate exploration activities on private land. Section 5.3.1 above outlines how this has been dealt with by jurisdictions in which dedicated CO_2 storage legislation exists.

The approach to permitting for sequestration facilities taken by New South Wales is illustrative of how jurisdictions without integrated CO_2 storage legislation might approach planning permitting of CO_2 storage activities. In New South Wales, geosequestration activities for the purposes of storing CO_2 are dealt with as "major projects" under Part 3A of the New South Wales *Environmental Planning and Assessment Act 1979* (NSW).[15] This means that proposed development relating to geosequestration must be approved by the New South Wales Planning Minister.

ENVIRONMENTAL IMPACT ASSESSMENT

In Australian, it can be necessary to undertake environmental impact assessments under both Federal and State and Territory legislation. Injection activities which impacted on a matter of national environmental significance could trigger Federal-level environmental impact assessment under the EPBC Act, as discussed in Section 5.3.1.

[15] "Development for the geosequestration of CO2" is a listed activity in Schedule 1 of State Environmental Planning Policy (Major Projects) 2005, which brings these activities within the application of Part 3A of the *Environmental Planning and Assessment Act 1979* (NSW).

In contrast, the Victorian GGGS Act adopts an integrated approach to environmental impact assessment. As outlined above, under that Act the Minister must in considering an injection testing plan, consider whether the testing will present a risk to the environment. Section 41 of the Act requires that the Minister provide a copy of a proposed plan to the Ministers assisting the *Environment Protection Act 1970* (Vic), the *Water Act 1989* (Vic) and the Environment Protection Authority. These Ministers may then make a binding recommendation that the proposed plan be approved or not approved on the basis of their opinion on whether the work proposed in the plan will present a risk to the environment, or whether the proposed risk management plan or monitoring and verification plan in relation to the environment are inadequate (see also Section 7.2.1).

PIPELINE LICENCING REGIMES

Pipeline licencing regimes are discussed in detail in Section 6.2.1 above.

CONSTRUCTION AND BUILDING CODES

There are not currently any CCS-specific building codes in Australia, so facilities constructed in the course of exploration activities would need to be consistent with applicable building codes.

STAKEHOLDER ENGAGEMENT

The Victorian GGGS Act provides for community consultation on the environmental impacts of injection testing plans. Where an injection testing plan applicant is not required to undertake an Environmental Effects Statement in accordance with the *Environmental Effects Act 1978* (Vic), the Minister must on receiving the injection testing plan publish details of the plan and allow the submission of public comment for a period of 21 days.

In Queensland, as discussed above, a tender for a GHG permit must include a statement indicating how and when the tenderer proposes to consult with and keep informed each owner and occupier of private or public land on which authorised activities for the permit are or are likely to be carried out (Queensland GGS Act).

Legal challenge to licencing decisions is dealt with in Section 7.2.1 above.

7.3 Taxation of CO_2 sequestration exploration activities

There are no CCS-specific taxation regimes in Australia which relate to exploration activities.

7.4 Evaluation

Federal, Victorian and Queensland CO_2 storage legislation provides robust permitting procedures for storage site exploration activities. That these regimes are in broad terms analogous to existing and well-established petroleum exploration regimes makes will increase their accessibility to market participants and reduce compliance costs associated with them.

One issue which could be dealt with in more detail is the treatment of permit areas which overlap or abut multiple jurisdictions. This issue is most likely to arise in respect of potential storage areas close inshore, where Federal and State jurisdictions meet. Such a situation would presumably be dealt with by exploration permit applicants seeking permits in respect of areas in both jurisdictions, but it would be useful to clarify this in the legislation or to investigate ways to reduce the regulatory uncertainties associated with such efforts.

A challenge in Victoria is the limitation in the scope of the Victorian GGGS Act to subsurface areas more than 15.24 metres below the land surface. The Victorian GGGS Act does not specify how exploration in respect of single potential storage formations spreading both above and below this line would be dealt with.

A further challenge relates to regulation of exploration activities in Australia. It is not clear why the Australian Government's GGS Act provides for both the grant of a GHG assessment permit and then the authorisation of individual activities under that permit. The Australian Government should consider consolidating these two approval stages into one to reduce compliance costs for market participants.

Finally, regulations under the Australian Government's GGS Act and the Queensland GGS Act have not yet been implemented and doing so would further strengthen these legislative schemes.

8. Injection and pre-closure of CO_2 storage formations

8.1 Introduction

Federal, Victorian and Queensland legislation provide that it is an offence to carry out unlicenced injection activities. In each of these jurisdictions when a geological formation has been proven as a CO_2 sequestration site, additional rights can be secured in respect of the site to enable commercial-scale sequestration activities. This is primarily achieved through the grant of an injection licence, which in general terms gives the holder the right to inject GHGs into proven or potential storage formations.

8.2 Integrated policy and legislation

8.2.1 Injection licencing

According to Federal, Victorian and Queensland legislation, injection of a substance into the seabed or subsoil without authorisation is an offence:

- Federally, under section 356 of the Australian Government's GGS Act;
- in Victoria, under section 18 of the Victorian GGGS Act; and
- in Queensland, under section 396 of the Queensland GGS Act (with certain exceptions including in relation to authorised enhanced petroleum recovery).

As discussed in Section 7.2 above, in each of these jurisdictions CO_2 injection can be licenced on an appraisal or commercial-scale basis. As in petroleum legislation, exploration permit holders, in each of these jurisdictions, can apply for retention leases where a CO_2 sequestration formation has been identified but cannot initially be exploited on a commercial scale. This section focuses on permitting for commercial-scale injection and monitoring.

APPLICATION CRITERIA

In general terms, the Federal, Victorian and Queensland legislation provides that applications for injection licences can be made either by GHG exploration permit holders or by other persons.

Application criteria in the three jurisdictions generally require applicants to:

- demonstrate the existence of a storage formation suitable for permanent storage;
- demonstrate that they have the technical and financial resources necessary to inject CO_2 in accordance with the terms of any licence granted;
- provide evidence that they have access to a commercial quantity of CO_2;
- provide a work or site exploitation plan, including details of the nature and volume of the substance to be injected; and
- provide a plan for consultation with other stakeholders who may be affected by the injection.

For example in Victoria, the legislation includes detailed requirements on how the Minister should decide between competing applications in respect of the same potential injection site. Where

applications have been received in respect of an advertised injection site, the Minister must decide between competing bids on the basis of the chief factors in the invitation. Other criteria the Minister must take into account include:

- the merits of the submitted injection work program and the likelihood of the injection being carried out;
- the applicant's assessment of the suitability of the identified formation for injection; and
- the likelihood of the injected substance being permanently contained in the identified formation.

In addition, the Minister must be satisfied:

- the applicant has access to a commercially viable volume of GHG substance;
- the identified formation is geologically suitable for injection and permanent storage; and
- the injected substance is likely to be permanently contained in the proposed storage area (Victorian GGGS Act).

Exploration permit holders can also be required to apply for injection licences where GHG storage formations have been identified. The Queensland GGS Act provides for mechanisms to facilitate transition from a GHG permit to a GHG lease. The Act provides for a permit holder to apply for a GHG lease when required by the Minister. Where the Minister considers that the holder of a GHG permit should apply for a GHG lease because a GHG stream is or soon will be available for stream storage her or she can give notice that an area of the permit will be excised from the permit area or the permit cancelled, unless the permit holder applies for a GHG lease over the relevant area. This allows the Government to ensure that potential sequestration sites are exploited as they are proven.

RIGHTS CONFERRED BY INJECTION LICENCE

Rights conferred by injection licences Federally and in Victoria and Queensland are summarised in Table 8-1.

Table 8-1 Comparison of injection licence rights under Federal, Victorian and Queensland legislation

Jurisdiction	Federal	Victoria	Queensland
Instrument name	Injection licence	Injection and monitoring licence	GHG injection and storage lease
Rights conferred	• inject and permanently store a greenhouse gas substance into an identified greenhouse gas formation wholly situated within the licence area; • explore in the licence area for a potential greenhouse gas storage formation; • explore in the licence area for a potential greenhouse gas injection site; • inject and store, on an appraisal basis, air, petroleum, water or a greenhouse gas substance into a part of a geological formation, so long as the relevant well is situated in the licence area; • inject, on an appraisal basis, a greenhouse gas substance in a part of a geological formation, so long as the injection of the stored greenhouse gas substance takes place at a well situated in the licence area; and • with the consent of the relevant Federal Minister, recover petroleum for appraisal that was discovered as an incidental consequence of the exercise of the exploration and injection rights above. Australian Government's GGS Act, section 357(1)	• carry out greenhouse gas substance injection and monitoring in the licence area; • carry out greenhouse gas sequestration formation exploration in the licence area; • do any thing in the licence area that is necessary for, or incidental to, those purposes. Victorian GGGS Act, section 71	Allows both “principal authorised activities” and “incidental activities” "Principal authorised activities" defined as: • GHG storage exploration; • evaluating the feasibility of GHG stream storage, including for example, by GHG storage injection testing; • compressing or otherwise processing a GHG stream for GHG stream storage; • GHG stream storage; and • monitoring and verifying the behaviour of the GHG streams. Queensland GGS Act, section 110 "Incidental activities" defined as: • any activity that is reasonably necessary for or is incidental to another authorised activity for the lease; • excluding constructing or using a structure other than a temporary structure, for office or residential accommodation. Queensland GGS Act, section 112
Licence term	• from the date of issuance until cancelled or surrendered, except that it can be terminated if no injection operation has taken place for a period of 5 years. Australian Government's GGS Act, section 359(1)	• from the date of issuance until cancelled or surrendered, except that it can be terminated if no injection and monitoring has taken place for a period of 2 years. Victorian GGGS Act, sections 175, 176	• from the date of issuance until cancelled or surrendered. Queensland GGS Act, section 134

The Australian Government's GGS Act takes an exhaustive approach to specifying the rights conferred by an injection licence. The Victorian GGGS Act adopts a more general approach to defining rights conferred, as does the Queensland GGS Act, which distinguishes between principal injection activities and other activities incidental to principal activities. In practice, the three approaches are likely to be similarly useful for licence holders. The comprehensive approach adopted in the Federal legislation provides a relatively more detailed list of rights conferred but this does not appear to constrain the right of licence holders to inject and monitor CO_2 because a large number of rights are specified.

CHALLENGING LICENCES

This is discussed above in Section 7.2.1.

8.2.2 Approval processes for sequestration facility closure

Under the Federal, Victorian and Queensland legislation, holders of injection licences must seek approval from the relevant Minister before injection licences can be surrendered and sequestration facilities closed. The purpose of these approval processes is to ensure that sequestered CO_2 is stable and that plans for long term monitoring and verification have been approved. Key assessment criteria for well closure and permit surrender include that any injected substance is stable; the submission of a monitoring and verification plan for injected substance; and reporting on the likely behaviour of any injected substance.

APPLICATION CRITERIA

The key criteria for sequestration facility applications Federally and in Victoria and Queensland are that storage wells have been closed and that injected material is geologically stable and able to be monitored.

Under the Australian Government's GGS Act, the Minister must approve the surrender of any injection licence only if:

- all relevant fees have been paid;
- all permit conditions under the Act and relevant regulations have been complied with;
- all of the permit holder’s property has been removed from the permit site;
- all wells made in the permit area have been plugged or closed off;
- the permit holder has provided for the conservation of natural resources in the permit area and made good any damage to the seabed or subsoil; and
- for an injection licence, an injection licence site closing certificate is in force in respect of each identified GHG storage formation.

In assessing closure applications the Minister must have regard to the matters outlined in Section 8.2.3. below.

To obtain a site closing certificate, a licence holder must submit an application which includes, relevantly, modelling of the behaviour of the injected substance; a report on the licence holder's assessment of the future behaviour of the injected substance, including its likely migration pathway and the consequences of any such migration; and suggestions on the approach to be taken by the

Australian Government to monitoring the behaviour of the substance. The Act obligates licence holders to apply for a site closing certificate within 30 days of the cessation of any injection operations.

The Queensland GGS Act provides for a similar process, a surrender application must include reports on:

- authorised activities conducted under the permit and the results of those activities;
- modelling on the behaviour of injected GHG streams and information relevant to the modelling;
- an assessment of the likely behaviour of GHG streams injected, including expected migration pathways and short and long term consequences of the inject;
- suggestions for the management of the well; and
- any other information prescribed under the regulations.

In approving a surrender application, the Minister must consider the extent to which the applicant complied with the terms of its permit and can only approve an application if he or she considers all risks arising from the inject have been reduced as much as reasonably practicable and if all relevant environmental authorities have been cancelled or surrendered (Queensland GGS Act). As under the Federal legislation, a surrender application must be made within 60 business days of the cessation of injection activities and well decommissioning.

CLOSURE APPROVAL PROCESS

The Federal legislation provides for the most comprehensive site closure approval process. Under the Australian Government's GGS Act holders of GHG assessment permits, GHG holding leases and GHG injection licences must undertake a common surrender approval process. Under the Act, the key stages in the approval process are:

- the permit holder applies for a site closing certificate;
- if the Minister is satisfied that injection operations have ceased or did not commence, he or she may issue to the permit holder a pre-certificate note indicating his or her intention to issue a site closing certificate;
- if required by the Minister, the permit holder must pay security to the Minister;
- a “closure assurance period” then runs for a minimum of 15 years (see below); and
- at the conclusion of the closure assurance period the Minister may accept the permit holder’s surrender application.

It is significant that the Minister is not required to determine a site closing certificate application until five years after he or she receives a site closing certification application. This provides the Australian Government with a significant period within which to confirm that injection operations have indeed ceased. It is not, however, clear why such a period is required. In addition, the Act does not clearly set out how liability should be apportioned in the event that leakage occurs from a storage site in the period between when a site closing certificate application is lodged and when it is determined.

Under the Queensland GGS Act, the key stages in the site closure process are:

- relevant wells are decommissioned or an injection licence is surrendered;

- the permit holder applies to the relevant Minister for the cancellation of any environmental authority attaching to the well; and
- the permit holder makes a surrender application to the Minister;

In addition to requiring that a surrender application be made upon well decommissioning, the Queensland GGS Act obligates tenure holders to ensure that a well is decommissioned before:

- in the case of a GHG lease, the storage reservoir reaches full capacity; or
- for a GHG [exploration] permit, the permit ends or the land upon which the well is located ceases to be in the permit area.

This may require exploration permit holders to surrender licences as elements of their permit areas are relinquished (see Section 7.2.1 above).

The Victorian GGGS Act provides an additional layer of scrutiny for well closures. Under that Act, the Minister must form an opinion on where the: the behaviour of the injected substance is predictable; whether the licence has reduced the risks associated with the substance to "as low as reasonably practicable"; and the stored substance will present a risk to public health and the environment. In forming an opinion on the likely risk to the environment of a stored substance, the Minister must provide copies of the surrender application to the Ministers for the Victorian EP Act, the *Water Act 1989* (Vic) and the Environment Protection Authority, any of whom may then make a binding recommendation on conditions attaching to the surrender decision.

8.2.3 Access / tenure

The Federal, Victorian and Queensland legislation provides that in each case the state owns the geological storage formation the subject of licencing and also injected CO_2.

The Victorian GGGS Act provides that if an injection and monitoring licence is cancelled or surrendered, the Crown becomes the owner of any GHG substance that has been injected into an underground geological formation under that licence. The Act does not specify who has property over injected material before the surrender or cancellation of the relevant injection and monitoring licence. The Queensland GGS Act takes a similar approach, except that the Government's ownership of the injected stream is expressed to subsist irrespective of whether the substance has been injected onto a well under land owned by a person other than the permit holder.

This section deals with establishing priority between uses at the injection and pre-closure stages. The Federal legislation provides the most rigorous framework for balancing uses in respect of both.

The Australian Government's GGS Act provides that the Minister may only grant an injection licence if he or she is satisfied that, to the extent that there is a significant risk that any of the operations that could be carried out under the injection licence will have a significant adverse impact on operations conducted by holders of other registered titles, the registered title holders have agreed in writing to the activities.

In assessing a permit surrender application, the Minister must have regard to any significant risk that injected substance will have a significant adverse impact on navigation, fishing, native title matters or any activities lawfully being carried out on a pipeline

The Australian Government's GGS Act provides that where an injection licence has been granted, the Federal Minister may give directions to protect geological formations containing petroleum pools. These directions can be to eliminate, mitigate or manage a risk that the operations envisaged in the

injection licence could have a significant adverse impact on the geological formations containing the resource or otherwise compromise exploitation of any petroleum which could occur in respect of those formations. Injection licence holders must comply with such directions.

The Federal legislation also provides protection for petroleum activities in assessments of surrender applications. Under the Australian Government's GGS Act the Minister should in assessing surrender applications have regard to the principle that plugging or closing off wells should minimise damage to the petroleum bearing qualities of geological formations.

SUBSEQUENT USES

Under the Federal legislation, the Minister must give directions similar to those provided above if there is a significant risk that injection activities will adversely affect future petroleum extraction activities (Australian Government's GGS Act). The Federal legislation also enables the Minister to act to eliminate a risk to a pre-commencement petroleum title by preventing an overlap in GHG and petroleum titles GHG operations will have a significant adverse impact on operations to recover petroleum from the pre-commencement petroleum title or the commercial viability of those operations. If it is not practical to eliminate such a risk, the Minister has the right to cancel an injection or suspend elements of the rights associated with it (Australian Government's GGS Act).

The Victorian GGS Act takes a similar approach to that adopted in relation to exploration injection testing. Injection licence holders must take all reasonable steps to obtain consents of other interest holders where there is a significant risk that injection could contaminate or sterilise other geological formations.

RIGHTS OF INDIGENOUS PEOPLES AND OTHER CUSTOMARY RIGHTS

This is dealt with in Section 6.2.3 above.

COMPULSORY ACQUISITION AND COMPENSATION REGIMES

Compulsory acquisition and compensation regimes are discussed in Section 7.2.2 above.

8.3 Taxation of injection and pre-closure of CO_2 sequestration facilities

Injection and pre-closure of CO_2 are not subject to any CCS-specific taxation.

8.4 Evaluation

The Australian Government's GGS Act provides for a 15 year closure assurance period, which should provide sufficient time to confirm the likely behaviour of an exploited well. This period is relatively short in comparison to the 30 year period under the European scheme.

In addition, it appears that only the Victorian GGGS Act deals with the issue of how wells spreading across multiple jurisdictions should be dealt with. The Australian Government and Queensland should deal with this issue in their legislation or regulation.

9. Post-closure and long-term storage of CO_2

9.1 Introduction

Given the long time frames associated with CO_2 storage, the development of CCS legislation regarding liability for sequestered CO_2 after well closure has been sensitive. This sensitivity has arisen from the need to balance the competing objectives of ensuring that operators of sequestration facilities are liable for environmental damage caused by sequestered CO_2 after well closure, against the practical difficulties which would arise from attempts to allocate such responsibilities to corporate entities over the time frames associated with CO_2 sequestration.

In general terms, the position adopted in the Federal, Victorian and Queensland CCS legislation is that ownership in sequestered CO_2 passes to the regulating government upon well closure, at which time the state also becomes liable for environmental damage arising from the sequestered CO_2. While the Victorian legislation is silent on long term liability after the surrender of a licence (creating a degree of ambiguity), under the Federal scheme, the legislation expressly provides for the transfer of long-term liability to the Australian Government 20 years from the end of a storage project. The 20 year period comes about as the Minister may consider the application for a site closing certificate for up to five years. The transfer of liability then occurs when certain conditions are satisfied and will not occur until at least 15 years after the injection site is closed. Under section 399, conditions include that the GHG substance injected into the formation is behaving as predicted.

9.2 Integrated policy and legislation

9.2.1 Obligations of approval authorities

The Australian Government's approach to approval authority liability is comparatively generous to permit holders. The Australian Government can assume long term liability for CO_2 injected into a formation fifteen years after injection operations have ceased, where a "closure assurance period" in respect of the formation has elapsed. Under the Australian Government's GGS Act, a closure assurance period will commence in respect of a formation on the day the Minister is satisfied that injection operations into the formation ceased and will end at least fifteen years later, when the Minister is satisfied that:

- the injected substance is behaving as predicted in the approved site plan;
- there is no significant risk that the substance will have a significant adverse impact on:
  - the geotechnical integrity of the whole or part of the geological formation or structure;
  - the environment; or
  - human health or safety; and
- no further injection has taken place since the initial cessation of injection activities.

If a site closing certificate has been issued in respect of a formation and a closure assurance period exists, the Australian Government's indemnity is then triggered in respect of the formation a formation when:

- a person who has been the registered holder of the relevant licence has ceased to exist;

- if the person had continued in existence their liability is:
  - a liability for damages;
  - attributable to an act done or omitted to be done in the carrying out of operations authorised by the licence in relation to the formation;
  - incurred or accrued after the end of the closure assurance in relation to the formation; and
- apart from this provision, the damages are irrecoverable because the person has ceased to exist.

The section also requires that any further conditions set out in the regulations have been met, however the regulations to the Act have not yet been passed.

The advantage of the Australian Government's indemnity is that it will facilitate efforts to over the long term minimise damage to the natural environment or human health caused by sequestered CO_2.

Conversely, given the infancy of CCS technology and the relatively small number of CCS projects which have been implemented, in including this mechanism in the Act the Australian Government is exposed to potentially very large liabilities arising from any environmental or other damage caused by sequestered CO_2. In addition, it may provide incentives to licence holders to restructure their corporate entities in an effort to trigger the indemnity and escape liability for damage arising from their injection activities. Whether this is possible will depend in large part on whether and how the corporate existence is dealt with under the regulations.

The governments of Victoria and Queensland have not taken on similar indemnities under their legislation. A provision in the Queensland GGS Act may, however, operate to protect permit holders from liability in some circumstances. The Act provides that GHG tenure holders will not incur civil liability for an act done, or omission made, honestly and without negligence under this Act if they complying with a direction given by the Minister to alleviate a serious situation. If this prevents a civil liability from attaching to a permit holder, that liability instead attaches to the Queensland Government. In the event that this protection was invoked by a permit holder in respect of damage caused by injection activities it is likely that the parties affected would seek to ensure that vicarious liability attached to the Queensland Government.

The Queensland GGS Act also protects Ministers from liability in administering the Act, public service officers or employees and persons authorised to carry out activities for the Queensland Government; such liabilities would also attach to the Queensland Government.

9.2.2 Monitoring and reporting obligations

The Federal, Victorian and Queensland legislation includes general provisions requiring sequestration operations to be carried out in accordance with approvals and permit obligations and giving administering authorities monitoring powers in respect of this. In general terms, after well closure and the surrender of relevant permits, monitoring responsibility passes to relevant governments.

The Australian Government's GGS Act requires that monitoring and reporting obligations be dealt with as part of the site closing certificate process. As discussed above, it requires that a site closing certificate application include a program of operations to be carried out by the Australian Government to monitor the behaviour of the injected substance, and that the cost of such program. The Act

provides for security to be provided by the licence holder in respect of the monitoring and verification costs. It does not include an assessment methodology for these costs.

The Victorian GGGS Act adopts a different approach, imposing a broad obligation on licence holders to meet the long term monitoring and verification costs associated with a well in respect into which a substance has been injected. Under that Act, where the Minister consents to the surrender of an injection and monitoring licence, the licence holder must before surrendering the licence pay "the remaining cost of carrying out long-term monitoring and verification." The Act states that the costs payable will be those arising from the provisions of the monitoring and verification plan submitted with the surrender application, but like the Australian Government's GGS Act, it does not provide a detailed methodology for the assessment of such costs. Such a methodology would enhance the predictability for project developers of the closure framework under this Act and could usefully be provided in forthcoming regulations to the Act.

The Queensland GGS Act does not detail a process for determining monitoring and liability obligations or costs, other than specifying that injected substance becomes the property of the Queensland Government after well closure. This will need to be dealt with in the regulations to the Act.

9.2.3 Leakage liability

SECURITY

Federal, Victorian and Queensland legislation requires holders of GHG permits to lodge security, which can include insurance, with relevant authorities, to protect against costs arising from environmental or other hazards caused by sequestered CO_2.

The Federal and Victorian approaches to this issue are similar. Under the Australian Government's GGS Act, GHG permits can include a condition that insurance be maintained against expenses, liabilities or "specified things" arising from work carried out under the permit, or the doing of any other thing under the permit, lease or licence. This can include "insurance against expenses of complying with directions relating to the clean-up or other remediation of the effects of the escape of a GHG substance." A similar obligation is imposed in Victoria under the Victorian GGGS Act. The legislation in both jurisdictions enables the Minister to increase the level of security required.

The Queensland legislation adopts a broader approach to the provision of security. The Queensland GGS Act empowers that Minister to require a holder of, or applicant for, a GHG permit to provide the state with security which can be used to meet a range of costs which are broadly defined. These include:

- any liability under the Act that the state incurs because of an act or omission of the permit holder;
- any unpaid amounts payable under the Act by the permit holder to the State, including unpaid civil liability and any debt payable, including in relation to the state's expenses in taking action to ensure permit holders undertake activities in compliance with their permit conditions.

Queensland's broad approach to security positions the Queensland Government well to limit its own exposure to future costs arising from sequestered CO_2, to the extent that this is possible in practical terms.

The legislation in Victoria and Queensland also provides for the payment of rehabilitation bonds against the cost of rehabilitating storage sites, including following well closure. In Queensland, this

falls within the legislative provisions outlined above. In Victoria, rehabilitation bonds are dealt with separately. The Victorian GGGS Act defines the purpose of rehabilitation bonds very broadly, to include providing for "any rehabilitation work, clean up work or pollution prevention work that may be necessary as a result of a GHG sequestration operation." The Act enables the Minister to carry out rehabilitation where this is necessary and to recover the cost of such rehabilitation as a debt. It is important to note that the Act restrains the Minister from deducting from a rehabilitation bond costs arising from long-term monitoring or verification arising from the surrender of injection rights under an injection and monitoring licence.

LIABILITY CAPS

As discussed above, the Federal, Victorian and Queensland legislation provides for debts arising from the damage caused by sequestered CO_2 to be recovered by relevant governments in courts of competent jurisdiction.

Under the Federal legislation, the Australian Government can recover costs and expenses arising from rehabilitation activities arising from a well closure. However the Australian Government's GGS Act limits the total of these recoverable costs and expenses to the Australian Government's own initial cost estimate. This substantially limits the Australian Government's ability to recover costs arising from well closure from well operator. In addition, as the cost estimates of permit holders will likely influence the development of the Australian Government's own cost estimates, this could also provide a perverse incentive for permit holders to under-estimate rehabilitation sites in their communications with the Minister.

VICARIOUS LIABILITY

This is discussed in detail in Section 9.2.1 above.

CONTRACTUAL ASSIGNMENT OF RESPONSIBILITY

None of the Federal, Victorian or Queensland legislation explicitly precludes contractual assignment of responsibility for environmental or other damage arising from storage or injection activities. However, the restrictions on permit transfers outlined below would in practice have a similar effect.

LONG-TERM CORPORATE LIABILITY IN THE EVENT OF CORPORATE RESTRUCTURING

The long time frames associated with CCS operations have challenged policy makers in Australia. Long term corporate liability in the event of corporate restructuring is one area in which this challenge is particularly acute.

Where permit holders are corporations and cease to exist, it may be difficult for regulators to enforce permit obligations or for third parties to sue for damage caused by CCS operations. This risk is addressed by the performance bond and security obligations outlined above. As discussed in Section 9.2.1 above, under the Federal legislation the Australian Government assumes liabilities which would otherwise attach to a corporation which ceases to exist.

Another risk is that in the course of corporate restructures GHG permits may be transferred to corporate entities not equipped with necessary financial or technical resources to fulfil permit conditions in accordance with relevant legislation. The Queensland legislation provides a useful example of how this risk can be addressed. The Queensland GGS Act provides that putative permit

transfers have no effect until they are registered. Putative transfers cannot be registered until they have been approved by the Minister. (Transfers by death or law are excluded from these restrictions.) Transferees must be the holders of relevant environmental authorities in respect of the permit and have provided financial assurance where required. The Minister may require security as a condition of giving approval for a transfer.

The Victorian legislation includes similar restrictions. The Victorian GGGS Act requires a person applying for the approval of a transfer to submit a range of information including details of the transferee's technical qualifications and the financial resources available to it, and evidence of the ability to comply with the Act of the person to whom the authority is to be transferred. The Australian Government's GGS Act also requires that potential transfers be approved by the Minister.

STANDING TO ENFORCE STORAGE OBLIGATIONS

None of the Federal, Victorian and Queensland legislation explicitly provides standing for third parties to bring legal proceedings to enforce storage obligations, beyond the broad rights to challenge grants of licences outlined in Section 7.2.1 above.

In States where separate planning permission is required for storage activities, it may be possible for third persons to seek to enforce provisions of planning consents attaching to those activities. Some Australian States planning legislation provides "any person" rights which could be used for this purpose. For example, section 123 of the New South Wales *Environmental Planning and Assessment Act 1979* (NSW) provides that any person may bring proceedings in the New South Wales Land and Environment Court to restrain breaches of the Act, irrespective of whether his or her rights have been infringed by the breach. In Queensland, section 4.1.21 of the *Integrated Planning Act 1997* (Qld) provides similar rights in respect of that Act and instruments implemented under it.

9.3 Evaluation

The Federal, Victorian and Queensland legislation provides reasonably robust management mechanisms for the liabilities which may arise from long-term storage of injected CO_2.

Provisions requiring security in the form of insurance and rehabilitation bonds will help to ensure that long-term liabilities arising from injection activities can be funded and that governments are not left with all such liabilities. That Ministers can require that the level of such security be increased should position the Federal, Victorian and Queensland Governments well to respond to changes in CCS technology or the known behaviour of injected CO_2 during the lives of injection wells.

The Australian Government's assumption of liability in the event that the injecting entity ceases to exist will have the effect of significantly reducing the commercial risks associated with the post-closure phase of CCS project development for market participants. Similar provisions under the Queensland GGS Act may have a similar effect. However, both Acts only provide basic treatment of corporate identity in this context and this may provide perverse incentives to injecting entities to change their corporate arrangements in order to trigger government liability assumption and evade long-term liabilities arising from their injection activities. Both jurisdictions will need to deal with this issue in regulations to the legislation.

However, at this very early stage in the development of CCS technologies it is very difficult to predict whether the post-closure elements of existing CCS legislation in Australia will be effective in enabling governments and market participants to manage long-term liabilities arising from CCS activities in

economically efficient and commercially reasonable ways. The Australian Government, Victoria and Queensland should revisit this element of their legislative frameworks as the technology evolves.

Opponents of CCS technologies may also criticise the apparent lack of mechanisms in the Federal, Victorian and Queensland legislation to facilitate public enforcement of maintenance and verification obligations. As discussed above, such mechanisms already exist in planning legislation in some Australian jurisdictions and if replicated could serve to increase public confidence in CCS in Australia.

10. Summary

10.1 CCS policy and legislation 'best practice'

A number of elements of CCS policy and legislation in Australia could be considered "best practice":

- in general terms, the CPRS;
- well-funded and proactive government-business cooperative research centres such as CO2CRC; and
- integrated CCS legislation at the Federal, Victorian and Queensland levels, which provides certainty to market participants and clearly set out systems of property rights and liability regimes.

10.2 Gaps in CCS policy and legislation

A number of gaps exist in Australia in relation to CCS:

- fragmentary regulation around non-pipeline CO_2 transport;
- capture activities not being regulated through storage regulation;
- compensation provisions in the CPRS Bill which weaken that scheme's effectiveness as a CO_2 pricing mechanism;
- interaction between schemes in different jurisdictions are not always clearly dealt with in existing legislation; and
- a lack of dedicated CCS legislation in most States.

10.3 Priority areas for future policy and legislative development

Australia should work to address the gaps identified above. The Council of Australian Governments could provide a useful forum for any such efforts. To encourage development and uptake of CCS technologies in the short term, Australian Governments should consider:

- incorporating CCS incentives into the CPRS or other mandatory cap and trade schemes;
- the passage of CCS legislation in States and Territories which could host CCS projects and which do not already have such legislation (as South Australia is doing);
- in the medium term, harmonising CCS regimes to reduce their administrative burden on market participants and also pipeline transport regimes to enable the development of an integrated national CO_2 pipeline network;
- ensuring through cooperative action that relationships between potentially overlapping schemes are clearly defined; and
- closely monitoring the effectiveness of new and existing schemes, particularly in managing long term liabilities, as CCS technologies develop.

11. References

11.1 Legislation and international materials

11.1.1 International material

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11.1.2 Legislation

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