

A Proposal For Greenhouse Gas Storage Exploration Incentives

**Carbon Storage Taskforce
June 2010**

Executive Summary

Carbon capture and geological storage (CCS) is the technology currently considered to have the greatest potential to mitigate greenhouse gas emissions from large-scale fossil fuel usage. The Carbon Storage Taskforce has identified that CCS combined with power generation and gas processing is likely to play a significant role in Australia.

The critical path for large scale deployment of CCS is the identification and development of suitable storage reservoirs. For aquifers, this is estimated to be 11-13 years. If CCS is to be a viable option for commercial deployment beyond 2020, then exploration for suitable storage sites should commence immediately. The consequence of a delay to the start of exploration will be a commensurate delay in timing of readiness for commercial deployment of CCS.

This report identifies a number of potential policy options that may assist in driving the uptake of greenhouse gas storage exploration and recommends a number of these options be given serious consideration by government.

The Taskforce considers that the single most important factor that will drive exploration for greenhouse gas storage sites is for governments to provide certainty about the forward greenhouse gas emissions price curve for Australia. However, a carbon price alone will not support accelerated greenhouse gas storage exploration in the near-term, without other transitional policy mechanisms.

In the absence of certainty about the forward greenhouse gas emissions price curve, there is little or no near-term commercial justification for companies to invest their shareholders' funds in storage exploration. Consequently, the Taskforce considers that, until greenhouse gas emissions pricing is firmly established, only those exploration activities fully funded or subsidised by governments are likely to proceed. The currently funded programs are:

- Pre-competitive exploration activities¹: the Taskforce has recommended a phased pre-exploration program costing \$254 million. Currently, an allocation of \$50 million has been provided by the Australian Government, supplemented by state and industry funding, in order to progress greenhouse gas storage pre-exploration activities.
- Exploration associated with the CCS Flagships Program²: through its \$2 billion investment in the CCS Flagships Program, the Australian Government is looking to establish two to four CCS projects, in support of the G8 goal to

¹ Pre-competitive exploration, that is exploration prior to the release of exploration acreage, has traditionally been undertaken by government to assist explorers for mineral, petroleum or geothermal resources. This data has been of great assistance in assisting in focusing the exploration efforts of individual firms. Pre-competitive exploration will also likely assist greenhouse gas storage explorers in identifying promising areas for greenhouse gas storage.

² The Clean Energy Initiative was announced by the Australian Government in the May 2009 Budget. This initiative is directed towards supporting the research, development and demonstration of low-emission energy technologies, including industrial scale CCS and solar energy. The CCS Flagships Program provides funding to support construction and demonstration of large-scale integrated carbon capture and storage projects in Australia, which may include gasification, post-combustion capture, oxy-firing, transport and storage technologies. The target is to create 1000MW of low emission fossil fuel generation.

develop at least 20 large-scale integrated CCS projects globally by 2020. The four CCS projects currently being considered have storage exploration in the Surat, Gippsland and Perth basins.

The exception to this may be stand-alone projects, such as the Gorgon Carbon Dioxide Injection Project, which are motivated by a site-specific business case. It is anticipated that, in the absence of certainty about the forward greenhouse gas emissions price curve, the number of similar niche projects will be very small.

The Taskforce considers that the most effective way to incentivise exploration for greenhouse gas storage sites is for government policy to ultimately provide a positive return for investors in CCS projects. The Taskforce therefore grappled with differentiating between incentives for exploration and macroeconomic policy incentives that would create a favourable investment climate for CCS projects.

In order to effectively frame any discussion around possible incentives, the Taskforce first considered areas of market and policy failure that may impede exploration for greenhouse gas storage sites. Opportunities to address these identified failures were then reviewed and assessed for effectiveness and good public policy. Those opportunities favoured by the Taskforce are captured in the following recommendations.

Recommendations

The Taskforce is of the view that governments should work to create an investment climate for CCS that provides sufficient return on investment so that CCS proponents are motivated to explore for carbon storage sites. This is preferable to policy options that essentially seek to share exploration risk between industry and government.

The policy opportunities favoured by the Taskforce are listed below. Many of these opportunities will require more formal design and assessment by government prior to consideration as government policy. This was not attempted by the Taskforce, given limited resources and time available.

Recommendation 1: Government to establish policies that create a positive investment climate that motivates companies to explore for greenhouse gas storage sites.

- The Taskforce considers that a sufficiently high carbon price would be the single most effective mechanism to ‘pull-through’ exploration for greenhouse gas storage sites, and to support low emission technology deployment more broadly. However, in the absence of other transitional policy mechanisms, a carbon price alone will not support accelerated greenhouse gas storage exploration in the near-term.
- The Australian Government should urgently consider options for transitional policy mechanisms to support CCS deployment with a view to implementation (from end 2010, if CCS is to be a viable option for commercial deployment beyond 2020). Such transitional policies must be complementary to the eventual introduction of a price on emissions of greenhouse gases as per the principles agreed by COAG in November 2008.
- Australian and State/Territory governments could invest in the development of storage hubs or could provide an availability charge to hub proponents, thereby

providing proponents with a level of certainty about investment returns.

Recommendation 2: A targeted pre-competitive exploration program is a necessary pre-cursor to commercial exploration activity. The Taskforce recommends that government invest in targeted pre-exploration and exploration activities.

- Australian and State/Territory governments to consider additional funding of Geoscience Australia and the State Geological Surveys to carry out the \$254 million pre-competitive exploration of storage basins identified by the Taskforce in the National Carbon Mapping and Infrastructure Plan (NCMIP). In the absence of certainty about the forward emissions price curve and given that exploration is on the critical path for commercial deployment of CCS, the Taskforce considers that the pre-exploration program identified in the NCMIP is a high priority and an essential precursor to commercial greenhouse gas storage exploration.
- The Australian Government to consider investing in opportunities where data specific to carbon storage could be obtained at relatively low cost by leveraging exploration in other industries (i.e. purchasing additional well log data, coring, deepening wells, etc. from explorers in other industries).
- Australian and State/Territory governments to consider directly investing in the exploration of carbon storage sites suitable for development as hubs.

Recommendation 3: The Taskforce has identified the following additional suite of actions that will assist in incentivising carbon storage exploration. These are important but are of second order supplementary impact, and are not in any way a substitute for the critical first order actions embodied in Recommendations 1 and 2.

- **Increase tenure** - consideration should be given to providing storage site explorers increased security of tenure until such time as CCS is viable.
- **Provide nationally consistent regulation** - Australian and State/Territory governments to work together with the objective of developing a nationally consistent approach to regulating greenhouse gas storage and amending their respective legislation in line with that nationally consistent approach.
- **Provide certainty in determining how resource conflicts are resolved** - governments should consider ways to provide greater legislative certainty with respect to determining how resource conflicts between CCS and other industries should be resolved.
- **Transfer of long term storage liability to facilitate insurance cover** – a legislated transfer of long term liability in CCS legislation from project proponent to government is likely to facilitate the offering of CCS insurance coverage. A clear process for the transfer of long term liability may be considered a prerequisite for many CCS explorers.
- **Clarify how resource taxation will apply to CCS projects** - governments should clarify in legislation the resource taxation that will apply to greenhouse gas storage projects. A resource taxation charge should only be payable upon an investor generating a positive economic/competitive return.
- **Taxation reform** - the Taskforce recommends consideration of reforms to the

company taxation system, which would improve the economics of low emissions technologies including CCS, such as the introduction of an immediate depreciation on capital investment in low emissions technologies.

- **Regulator capability and capacity** - regulatory bodies will need to develop the appropriate skills and knowledge capability in order to effectively and efficiently regulate greenhouse gas storage exploration and appraisal activities.

Background

The Carbon Storage Taskforce was established by the Australian Government in October 2008 to develop a National Carbon Mapping and Infrastructure Plan (the Plan). The primary aim of the Plan was to develop a road map to drive prioritisation of, and access to, a national geological storage capacity to accelerate the deployment of carbon capture and storage (CCS) technologies in Australia. The Plan was submitted by the Taskforce to the Federal Minister for Resources, Energy and Tourism in September 2009.

The Taskforce concluded that the identification and development of suitable storage reservoirs is on the critical path for large scale deployment of CCS and that exploration programs should commence immediately to meet the Government's targets for deployment of CCS by 2020.

In order to help realise this objective, the Taskforce recommended ongoing work to:

Identify and recommend incentives to drive competitive greenhouse gas storage exploration over the period 2010-2017, in concert with other policy and fiscal settings established to support deployment of low emissions technologies, including CCS.

The Minister subsequently requested the Taskforce to outline options that may provide incentives for the exploration of potential greenhouse gas storage sites for consideration by Government in the current circumstances facing industry.

ACIL Tasman was engaged to assist the Taskforce to identify and assess incentives for greenhouse gas storage exploration. A workshop was held on 8 April 2010 to identify policies and mechanisms that may incentivise firms to take up greenhouse gas storage acreage and explore that acreage. Prior to the workshop, participants were provided with a detailed discussion paper prepared by ACIL Tasman.

The outcomes of the workshop were summarised by ACIL Tasman and given further consideration by the Taskforce. The results of that consideration are documented in this report.

Market and policy failures impeding exploration for greenhouse gas storage sites

The Council of Australian Governments has agreed that policy measures to complement a price on greenhouse gas emissions should comply with principles of effectiveness, economic efficiency, administrative simplicity and equity. In particular, any policy that is justified as addressing continuing market failure with the proposed introduction of emissions trading should be tightly targeted.

The Taskforce considers that policies to incentivise exploration for greenhouse gas storage sites should be considered in this context, given that CCS is principally a response to the risks posed by climate change.

The Taskforce proposes that additional policies to incentivise exploration for greenhouse gas storage should be considered only if a market or policy failure can be identified.

Market failures

The term “economic efficiency” refers to the allocation of the various resources available in the economy to uses that yield the highest valued patterns of production and consumption. Markets generally allocate resources reasonably efficiently, however, there may be circumstances where this allocation does not occur efficiently. Such cases are referred to as “market failures”.

The market failures that could impede exploration for greenhouse gas storage sites include:

- **Unpriced greenhouse gas emissions** – greenhouse gas emissions impose uncompensated climate change costs on others (external costs). Introducing an explicit or implicit price on greenhouse gas emissions would internalise the external costs and provide an incentive to deploy CCS, and therefore to explore for greenhouse gas storage sites.
- **Exploration information spillovers** – when exploration is undertaken by one party, other parties benefit from the information that “spills over”. This may cause explorers to explore less and later than is desirable as they hope to gain data from exploration undertaken by others.
- **Exploration innovation spillovers** – when exploration is undertaken by one party, other parties benefit from the information that “spills over”. External benefits are generated. Because the initial explorer would not gain all of the benefits of its own exploration, it might explore less and later than is desirable from a societal perspective. In a similar way to information spillovers, explorers may choose to delay exploration, to avoid having to develop knowledge, having that knowledge spilling over to other explorers and in the hope they may learn from others.
- **Other information spillovers** – early explorers will gain valuable information about the cost structure of greenhouse gas storage exploration that will partly spill over to later explorers. Early explorers will not be able to capture all of these benefits. Encouragement of more spillovers may be socially desirable.
- **Coordination externalities** – exploration for greenhouse gas storage sites and the development of CCS technologies are strongly interdependent. Uncertainties interact and have compounding effects to the detriment of both forms of activity. Coordinated advances on both fronts would be mutually beneficial.
- **Missing public inputs** – a legislative framework is required that supports greenhouse gas storage exploration by facilitating a market for the necessary

insurance products.

Policy failures

The term “policy failures” refers to government interventions that cause deviations from economic efficiency in pursuit of other objectives. Occasionally policy failures may arise where existing policy provides for uncertain outcomes for project proponents. This uncertainty can undermine efficient decision making.

Policy failures that could impede exploration for greenhouse gas storage sites include:

- **Exploration tenure policies** – the duration of exploration tenure and demanding relinquishment provisions in State and Commonwealth greenhouse gas storage legislation may not give CCS explorers certainty, particularly when CCS may not be commercially attractive for several decades.
- **Policies on resource conflicts** – the potential for resource and land use conflicts and CCS legislation that provides for ministerial discretion may create uncertainty in the minds of explorers such that they are less willing to undertake exploration. Alternatively, explorers may focus on areas where conflict is less of a problem but may not be as prospective.
- **Resource taxation** – the ability for a jurisdiction to levy volume-based royalties on greenhouse gas storage operations may impede development of CCS projects, including exploration for greenhouse gas storage sites.
- **Regulatory uncertainty and inconsistency** – regulatory regimes that differ between jurisdictions and depart from efficient regulatory benchmarks create economic inefficiencies. Regulatory inconsistency is a particular disincentive for potential explorers seeking to explore in more than one jurisdiction or where potential storage sites are located close to jurisdictional boundaries.
- **Taxation regime** – the current company income taxation system may discourage investment in CCS because gains and losses are treated highly asymmetrically, particularly for highly uncertain activities such as greenhouse gas storage exploration.

Identification of policy options

Policy options have been identified to tightly target the market and policy failures identified above. These policy options are summarised in Tables 1 and 2.

Table 1: Summary of policy options to target market failures associated with greenhouse gas storage exploration

Market failures	Policy options	Incentive or remove disincentive?
Unpriced greenhouse gas emissions	Explicit pricing of greenhouse gas emissions, either through an emissions	Provide an incentive for the

	trading scheme or a carbon tax. Implicit pricing of greenhouse gas emissions, for example through a mandatory requirement to be storage ready (as compared to capture ready).	exploration of greenhouse gas storage sites.
Exploration information spillovers and exploration innovation spillovers	Government subsidies for greenhouse gas storage exploration in the form of a funding contribution or low interest loans. Government subsidies for incremental work by other explorers to acquire additional information on the greenhouse gas storage potential of an area.	Incentive Incentive
Coordination externalities	Government coordination and guarantees for the development of greenhouse gas storage hubs Provision of an availability charge - government would underwrite the development of a storage site by offering to fund any shortfall between projected and actual stored volumes.	Incentive Incentive
Missing public inputs	Facilitate the offering of insurance products dealing with long term liability by providing a clear transparent process for site closure and transfer of liability to government in legislation.	Remove disincentive

Table 2: Summary of policy options to target policy failures associated with greenhouse gas storage exploration

Policy failures	Policy options	Incentive or remove disincentive?
Exploration tenure policies	Align tenure of greenhouse gas storage exploration and retention rights with likely timescales for the commerciality of CCS. Note: consideration will need to be given to balancing the competing interests of security of tenure and avoiding the hoarding of acreage.	Remove disincentive
Policies on resource conflicts	Clarify in legislation how conflicts between CCS activities and other industries will be managed. Current CCS laws in many jurisdictions default to ministerial discretion, which creates uncertainty for potential explorers.	Remove disincentive

	Note: preserving any pre-existing rights enjoyed by other industries while still trying to provide certainty for CCS proponents will be critical, to avoid the introduction of sovereign risk issues in those other industries.	
Resource taxation	Provide certainty about the resource taxation regime that will apply to CCS projects.	Remove disincentive
Consistency of regulation	Make legislation across jurisdictions consistent. Capability development within regulators to effectively administer greenhouse gas storage operations.	Remove disincentive Remove disincentive
Company Taxation	Reform of the company tax systems to improve the economics of CCS.	Incentive

Policy options to address these market and policy failures and the assessment of each options benefits and tradeoffs are briefly described in the following sections.

Unpriced greenhouse gas emissions

CCS projects will not be commercially viable unless there is a high degree of certainty that a future price (either explicitly or implicitly) on greenhouse gas emissions will be sufficiently high. Unless the costs of CCS can be reduced significantly, it may take many years before CCS is commercially attractive at large scale. Until industry sees CCS projects as commercially attractive within the next ten years, there is little incentive to undertake exploration for potential greenhouse gas storage sites.

While the pricing of greenhouse gas emissions and broader climate change policy was outside the scope of the Taskforce, it is clear that there is little point in providing further policy incentives for exploration activities until there is a clear path to pricing greenhouse gas emissions in Australia.

The Taskforce considers that the single most important factor that will drive exploration for greenhouse gas storage³ sites is for governments to provide certainty about the forward emissions price curve for Australia.

A sufficiently high carbon price would be required to drive commercial CCS deployment. Modelling of the National Energy Market by the Taskforce⁴, and under the CPRS, shows this was not expected until post-2025.

³ Or the economically efficient deployment of any other low emissions technology.

⁴ *National Carbon Mapping and Infrastructure Plan - Australia*, Carbon Storage Taskforce Report, 2009

A carbon price alone (even if sufficiently high) will not accelerate CCS deployment in the short-medium term in the absence of CCS-specific policy measures. All things being equal, a carbon price will most immediately support the deployment of cost effective technologies and may result in sub-optimal levels of investment in the earlier phases of the innovation chain. This was acknowledged in the Garnaut Review.⁵

Government subsidies for exploration

A government contribution to the exploration costs of firms searching for greenhouse gas storage sites could be justified on the grounds of information and innovation spillovers associated with first-in-field exploration. This contribution could be provided through subsidies or loans. For example, government could offer to fund a proportion of a firm's greenhouse gas storage exploration costs, with strong information-sharing obligations locked in. This may be most effective in the early stages of greenhouse gas storage exploration when there are more significant spillover benefits, and in the absence of a carbon price.

The *Petroleum Search Subsidy Act* (PSSA) of the 1950s and '60s is an example of a subsidy scheme which was designed to kickstart Australia's petroleum industry and address Australia's need for crude oil security. In return for this subsidy, oil explorers were obligated to provide exploration data to government, as at the time, very little was known about the geology of Australia's sedimentary basins. While there was a definite increase in oil exploration around the time of the PSSA, it is important to note that there were a number of other policies in place at this time to promote an Australian oil industry. Most Australian jurisdictions that have regulated for greenhouse gas storage have included open file data provisions in that legislation.

Australia has many sedimentary basins, some of which are now very well known and explored, and others with little or no information. In basins with oil and gas production, data and knowledge of the basin's architecture and geology is generally much better due to the open file data regulations, although even in these basins, the focus of the oil and gas industry is on the structural high trends and not in the deeper parts of the basin that may be attractive for greenhouse gas storage.

In its report, the Taskforce identified the need for a \$254 million pre-competitive exploration program, funded by government.⁶ The objective of pre-competitive exploration is to establish that a basin is likely to have sufficient storage potential to justify release for efficient commercial exploration and development, and to ensure that enough is known about the basin to release acreage in a way that optimizes the storage potential of the basin.

On balance, the Taskforce is of the opinion that government should focus on adequately funding pre-competitive exploration by Geoscience Australia and the various State Geological Surveys, rather than providing government subsidies for exploration activities by firms.

Government should also consider investing in opportunities where data specific to greenhouse gas storage could be obtained at relatively low cost by leveraging

⁵ Garnaut Climate Change Review, 2008

⁶ National Carbon Mapping and Infrastructure Plan – Australia, Carbon Storage Taskforce, September 2009

exploration activities in other industries. For example government could offer to pay an oil and gas or geothermal explorer to deepen an exploration well or to cut a core in a sealing unit. That data, which would otherwise not be acquired, could be acquired at relatively low cost and then be made publically available. In effect, this represents a cost effective method of obtaining additional precompetitive bid data.

A potential drawback with such arrangements is that they are potentially management- intensive as they have to be run on an opportunity-by-opportunity basis. The Taskforce recommends that governments consider such opportunities to add to Australia's geologic database.

A further important source of information and innovation spillover is research and development. The Taskforce notes the beneficial role that research and development plays, particularly in the pre-competitive and early phases of exploration, and urges governments to continue to fund and support it.

Coordination externalities

As indicated in the Taskforce's report, much of the potential for CCS lies in the establishment of hubs, which would aggregate greenhouse gases from multiple sources and transport and store those gases in a single large storage site. It is likely that hubs will be required to achieve economies of scale to ensure CCS can compete with other low emissions technologies. It is acknowledged that some projects may be large enough to be viable on an individual stand-alone basis and may not need to be part of a hub.

Even with a significantly high price on greenhouse gas emissions, the co-ordination required for any firm to contract with a number of emitters in order to develop a CCS hub will be significant. As a consequence it is likely that, in the short to intermediate terms, firms may only seek to undertake CCS on a facility-by-facility basis, thereby losing the efficiency of scale associated with developing hubs.

This co-ordination issue could be overcome by government directly investing in exploration for storage sites suitable for hubs. It may ultimately be necessary for government to establish those hubs with a view to eventual privatisation once CCS becomes established.

The development of Australia's domestic gas industry represents an analogy, where governments undertook to build and operate much of the transportation and distribution infrastructure and have relatively recently sold this infrastructure to private industry.

The Taskforce recommends that governments consider directly investing in the exploration of greenhouse gas storage sites suitable for development as hubs.

Alternatively, an availability charge could be considered as a means of pulling through exploration activity. The Government would undertake to pay a "take or pay" fee to a potential greenhouse gas storage explorer in the event the explorer successfully finds a site and in return for the explorer making a greenhouse gas storage site available. This will require careful analysis and consideration.

Liability and insurance

Legislation authorising greenhouse gas storage operators in Australia generally provides that explorers and storage site operators be required to hold insurance policies as specified in the licence or by the relevant Minister. Given a potential requirement to hold CCS insurance, many firms may be disinclined to explore for greenhouse gas storage sites until such products are readily available.

Insurance to cover risk during exploration is generally available through the coverage offered to the oil and gas industry (eg. control of well, pollution, clean up and redrilling). However the availability of insurance to cover risks associated with the long term storage of greenhouse gases is limited, with only one or two products being offered on the commercial insurance market.

There are two primary mechanisms to address the lack of commercial insurance offerings; government establishes an insurance pool funded by a levy on industry; or government establishes policy settings that facilitate the offering of commercial insurance products. It is the view of the Taskforce that the development of commercial insurance products is preferred as the most efficient outcome.

A significant barrier to the provision of commercial insurance products dealing with long term risk associated with greenhouse gas storage sites is the different approaches taken by jurisdictions to site closure and transfer of long term liability. A number of Australian jurisdictions have elected not to legislate a transfer of liability, instead deferring to the common law to manage longer term risks. While this may be an appropriate policy response, it does create uncertainty for potential insurance providers. This uncertainty could be reduced, and the provision of commercial insurance products facilitated, if all jurisdictions provided for a clear transfer of long term liability⁷ from the project operator to the government.

Exploration tenure

The limited period that an exploration right may be held in some jurisdictions, and the relinquishment conditions, may not be consistent with the time required to appropriately explore and appraise a site. The progression from an exploration permit to a retention lease to a production/storage licence is uncertain, and the period that a retention lease can be held may be inconsistent with the timeframe within which CCS projects may be commercially viable.

If governments wish to see exploration for greenhouse gas storage sites commence well in advance of an emissions price that will make CCS commercially attractive, governments must ensure that explorers will have confidence that they will be able to hold any discovered storage site until such time as these sites are able to be commercially developed.

Providing security of tenure to potential CCS proponents must be balanced against the need to ensure that sites are not held needlessly. If such a longer retention of acreage is being considered, it would be appropriate to consider adequate checks and balances, similar to the concept of Retention Leases for conventional hydrocarbons, are in place to ensure that the acreage is not held under tenure for unduly lengthy periods of time or without being assessed and appraised

⁷ Such as that contained in the *Offshore Petroleum and Greenhouse Gas Storage Act 2006 (Commonwealth)* that strikes a balance between risks carried by project operators and government.

appropriately.

The Taskforce recommends that the issue of length of tenure be the subject of further discussion between industry and the jurisdictional regulators to determine an appropriate regime, given that it may be some decades before CCS is commercially viable.

Resource conflict

Three areas of potential resource conflict have been recognised by the Taskforce:

- overlapping rights enjoyed by different industries;
- pre-existing rights; and
- the impact of greenhouse gas storage operations on other rights holders.

It is the preference of the Taskforce that regulatory regimes establish a framework by which pre-existing rights are preserved, the relevant parties negotiate to resolve any conflicts, with the government/minister being used to facilitate such negotiation and, as a last resort, arbitrating an outcome.

Greenhouse gas storage legislation in many jurisdictions is either silent on areas of resource conflict or defers to the Minister's decision in the National Interest. This creates uncertainty in the minds of potential explorers who, having invested significant resources in exploring for a storage site may not be able to develop that site due to a potential resource conflict.

While the management of resource conflict issues are complex, the Taskforce recommends governments consider ways to provide greater legislative certainty when it comes to determining how resource conflicts should be resolved.

It is, however, critically important that the pre-existing rights enjoyed by others are maintained so as to avoid introducing sovereign risk issues into those industries.

Resource Taxation

There is currently a provision in most greenhouse gas storage legislation for government to levy resource taxation (most often in the form of volume based royalty) in return for rights to exploit the subsurface pore space. A number of jurisdictions have indicated they do not propose to impose resource taxation on greenhouse gas storage projects until such time as these projects enjoy a competitive rate of return. However, the uncertainty as to whether resource taxation will be applied, particularly during the period where the price on greenhouse gas emissions is insufficient to provide a commercial return to CCS investors, may be a disincentive to greenhouse gas storage exploration.

Consistency of Regulation

Since the release of the Australian Regulatory Guiding Principles for Carbon Capture and Storage by the Ministerial Council on Mineral and Petroleum Resources a number of jurisdictions have passed legislation authorising greenhouse gas storage related activities. Despite the work by the Ministerial Council, the approach taken by

jurisdictions varies, in some cases quite dramatically. Some areas of inconsistency include liability, insurance, security of tenure, and resource conflicts, which have been discussed earlier.

This creates a regulatory burden on firms looking to undertake exploration and storage operations in more than one jurisdiction and creates uncertainty where sites are located close to jurisdictional boundaries.

Without underestimating the challenges in moving all Australian governments towards a nationally consistent approach to regulating greenhouse gas storage, the Taskforce recommends that such an outcome would reduce the regulatory burden on industry and may assist in promoting a favourable exploration climate.

In addition to the challenge of having to address differing regulations in each jurisdiction, potential storage site explorers are being faced with regulators who are unfamiliar with greenhouse gas storage, and there is a risk that, without the appropriate skills and knowledge, regulators will potentially require additional data acquisition and modelling, beyond that necessary. This is not surprising given the 'newness' of CCS as a concept.

Regulatory bodies will need to develop the appropriate skills and knowledge capability in order to effectively and efficiently regulate greenhouse gas storage exploration and appraisal activities.

Company Taxation

The current company income taxation regime treats losses and gains asymmetrically and taxes all returns to equity capital including minimum required or "normal" rates of return. This impacts on the overall return on investment that may be generated by a CCS project and effectively means the price on greenhouse gas emissions must be higher for a project to go forward than would otherwise be the case.

While commenting on reform of the company tax system is outside the scope of the Taskforce, there are opportunities to reform the taxation system that would positively impact on the economics of CCS projects and potentially provide an incentive for the exploration of greenhouse gas storage sites.

For example, the introduction of an immediate depreciation on capital investment in low emissions technologies⁸ would assist in improving the economics of projects that would address the risks posed by climate change, including CCS, and reduce the greenhouse gas emissions price where projects become viable.

The Taskforce recommends consideration of reforms to the company taxation system, which would improve the economics of low emissions technologies, including CCS.

⁸ Depreciation concessions for all low emissions technologies would be preferred to just investments in CCS and could be justified by lowering the economic cost to industry of moving the Australian economy to a lower emissions future. Restricting such concessions to CCS would imply government picking CCS as a winner.