

**AMENDMENTS TO OFFSHORE PETROLEUM LEGISLATION TO
PROVIDE FOR GREENHOUSE GAS TRANSPORT, INJECTION AND
STORAGE IN COMMONWEALTH WATERS**

REGULATION IMPACT STATEMENT

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AMENDMENTS TO OFFSHORE PETROLEUM LEGISLATION TO PROVIDE FOR GREENHOUSE GAS TRANSPORT, INJECTION AND STORAGE IN COMMONWEALTH WATERS

1. REGULATORY PROPOSAL

Geological storage has been recognised internationally as having important potential to significantly reduce greenhouse gas emissions, and is integral to a number of emerging low-emission energy and industrial technologies. However, while there is good understanding of many of the technology issues, international experience of long term geological storage is extremely limited. If expansion of the use of geological storage is to be feasible, investors will require certainty about the regulatory environment, and the public will require confidence that risks are well controlled.

The Commonwealth Government has been working towards the development of such regulation in Commonwealth waters, that is, those areas seaward of three nautical miles and within Australia's continental shelf. These areas are already the location of an active offshore petroleum industry, which itself has rights to the subsurface provided by well established petroleum law. The Commonwealth's regulatory proposal is for the introduction of amendments to this petroleum legislation to regulate greenhouse gas transport, injection and storage in these waters, in a way which balances those rights with the needs of the community and potential investors.

Problem

The problem to be addressed is how to apply best practice regulatory principles for geological storage in Commonwealth waters.

Much of the analysis of alternative regulatory approaches has already been provided by COAG's Ministerial Council on Minerals and Petroleum Resources (MCMPR), which in 2005 released *Carbon Dioxide Capture and Geological Storage: Australian Regulatory Guiding Principles*, which constituted a Regulation Impact Statement (RIS), which is available from www.ret.gov.au/general/resources-CCS. Key decisions associated with the implementation of these guiding principles in the case of Commonwealth legislative amendments are discussed further in Section 3 below.

The Regulatory Guiding Principles highlighted the challenges in reconciling views of stakeholders in developing a regulatory approach. Since the release of the MCMPR report the Commonwealth has continued to engage State/Territory and other stakeholders with the view to better understanding stakeholder impacts and ensuring consistency in any regulatory regime. This consultation process, which is described in more detail in Section 2, has helped to address a number of threshold implementation issues, but has also highlighted that many stakeholders are withholding judgement on the regulatory proposal until they can consider the detail of any draft legislative amendments. A key challenge in addressing the problem will be providing stakeholders with sufficient detail of the regulatory proposal so they can make informed comment on its impacts.

Scale of the Problem

The risks associated with this regulatory proposal are that the framework may act as a disincentive for petroleum or geological storage activities, that geological storage activities might go ahead in a manner which damages other rights or resources, or that the stored greenhouse gas is allowed to leak. There are also the other risks common to the petroleum industry, in areas such as health, safety or environment.

In considering the regulatory proposal, the potential scale of a new greenhouse gas transport, injection and storage industry in Commonwealth waters has to be taken into account. There are likely to be only a relatively small number of projects in offshore waters in the first five years. These projects, however, are likely to be very large scale. Overall it is estimated that no more than ten release areas would be the subject of substantial evaluation as storage opportunities in this timeframe. The number of projects to progress to injection and storage is likely to be no more than half this.

Experience with the permanent storage of large quantities of gases is limited. However greenhouse gas transport, injection and storage activities are expected to be close analogues to offshore petroleum in scale and complexity. Exploration will cost from hundreds of thousands to multiple millions of dollars, and the costs of a greenhouse gas transport, injection and storage project would be in terms of hundreds of millions or some billions of dollars. Experience from the petroleum industry suggests such projects necessitate some complexity in regulation.

Issues Not Covered in this RIS: Regulations and Guidelines

It should be stressed that the Government has yet to make any decision on the *regulations* and *guidelines* to cover things such as public interest tests, impact significance tests, assessments and approvals, monitoring and verification, financial issues and post closure responsibility. Aside from acknowledging those used in offshore petroleum as a useful starting point for many of these instruments, it appeared inappropriate to pursue this level of detail without first soliciting clearer feedback from stakeholders on the proposed legislative amendments. As a consequence, many issues relating to the final cost of regulation also cannot be assessed at this stage, and will be the subject of a future analysis.

Objectives

The aim of the legislation is to provide an enabling framework for objective-based regulation which will allow a new greenhouse gas transport, injection and storage industry to operate in Commonwealth waters while:

- meeting the industries' need for investment certainty;
- meeting community expectations by addressing issues such as safe and secure storage of greenhouse gases, protection of the environment and occupational health and safety;
- providing a system for managing the rights and needs of other users of the sea and the subsurface (including the offshore petroleum industry);

- providing a modern regulatory regime that encourages best practice and continuous improvement.

The success in meeting these objectives will be tested, in this stage of the process, through stakeholder comments on the exposure draft of the legislation. In the next stage of the process, stakeholder comments on the details of regulations and guidelines, when these are developed, will provide a further measure of appropriateness of the framework. Stakeholder reaction when individual projects are being developed and are subject to the regulatory process will provide a final test. We would also propose that the legislation be reviewed five years after it commences.

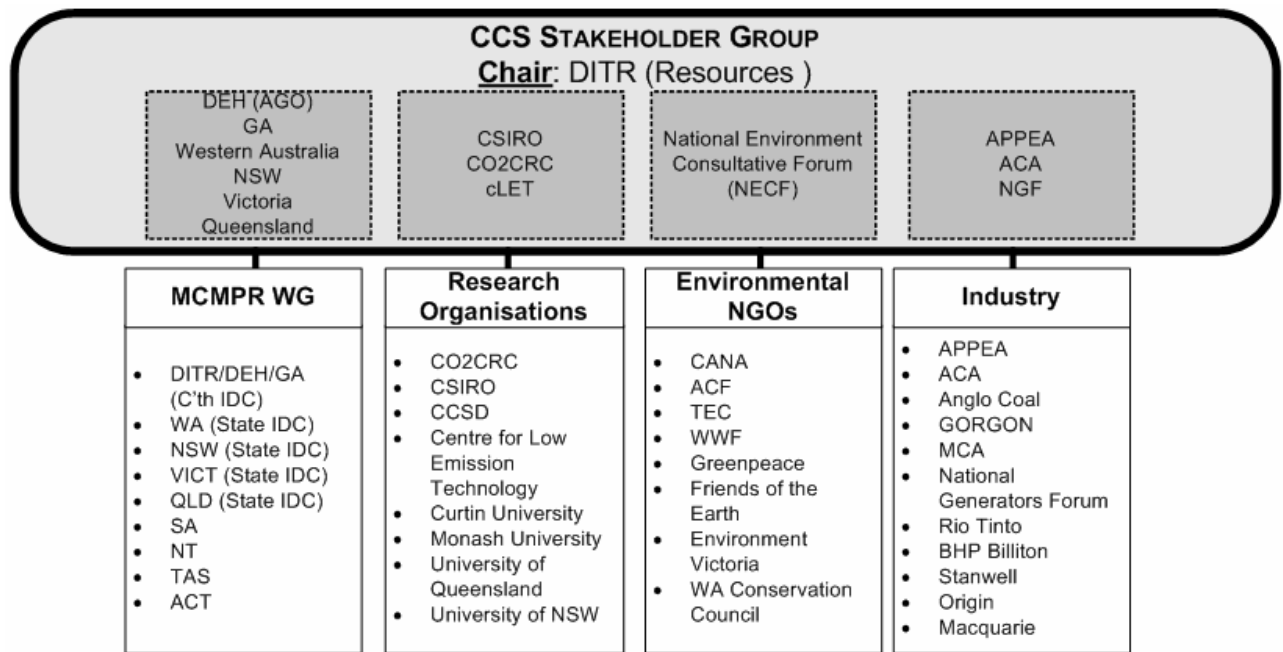
2. CONSULTATION

Following the release of the Regulatory Guiding Principals, the MCMPR Contact Officers Group met in April 2006 to begin work on a discussion paper addressing the implementation of a national regulatory regime for carbon capture and storage (CCS) projects in Australia. The MCMPR Contact Officers Group drew membership from the Commonwealth and each State and Territory, with each member responsible for consolidating comments raised from consultation within their jurisdiction.

In early July 2006, a draft of the discussion paper entitled *"Implementing an Australian Regulatory Framework for Carbon Capture and Geological Storage"* was circulated by the Contact Officers Group, setting out options on how the Regulatory Guiding Principles might be applied to greenhouse gas injection and storage in Commonwealth waters.

This draft paper was circulated to members of both the Inter-Departmental Committee (IDC) on CCS and the CCS Stakeholders Group (see below for membership), inviting comment. A CCS Stakeholder Group meeting was held on 26 July 2006 to discuss the draft paper and assist in clarifying any issues or concerns held by stakeholders on the proposal. Following from the meeting, the then DITR invited formal submissions from stakeholders on the proposed legislative model described in the draft discussion paper.

Nine submissions were received in response to the paper. Some petroleum companies were concerned that, despite the proposed no significant negative impact test, greenhouse gas injection operations could still impact adversely on their activities. Other non-petroleum companies were concerned that the 'no significant impact test' could effectively quarantine prospective storage sites for many decades. Many stakeholders highlighted the importance of the Government in providing further detail of its proposed legislation to allow better assessment of how these concerns would be addressed. Specific issues are discussed further under Section 3 of this statement. In general, the submissions were supportive of the regulatory model as it related to proposed legislative amendments.



On 28 July 2006 the MCMPR Standing Committee of Officials (SCO) gave in principle support to the legislative model presented in the discussion paper. However, full endorsement was not given due to outstanding issues associated with overlapping rights, managing conflict over property rights, and clarification of long term liability and decommissioning.

Following on from this SCO meeting, the Contact Officers Group undertook to revise the CCS discussion paper based upon stakeholder comments, separately outlining the proposed legislative framework for access and property rights for CCS in offshore Commonwealth jurisdiction and summarising the further work required to underpin the legislation, particularly long term liability and decommissioning issues.

The finalised discussion paper "Implementing an Australian Regulatory Framework" was endorsed out of session by the SCO group in November 2006. The main elements of this framework were:

- the use of existing Commonwealth legislation (the *Offshore Petroleum Act 2006*) to provide a regime for access and property rights similar to those used for petroleum.
- an acreage release system similar to that used for petroleum;
- protection of the rights of pre-commencement petroleum title holders by requiring the greenhouse gas operator to satisfy the regulator that there would be no significant adverse impact on petroleum operations;
- for post commencement titles, a public interest test to decide which activity should proceed, if the petroleum and greenhouse gas operations could not co-exist;

- a closure procedure which involved post-injection monitoring to provide the regulator with assurance that the injected substance was behaving as predicted before the operator could relinquish the title.

A working group consisting of representation from the then DITR, the Australian Government Solicitor and Geoscience Australia, commenced development of drafting instructions for the legislation in early 2007 with drafting of the proposed legislation ongoing through 2007.

A meeting of the MCMPR Contact Officers Group was held in March 2007 to discuss regulatory requirements and report on progress of the drafting of proposed CCS legislation. In June 2007, the Environmental Protection and Heritage Council Standing Committee of Officials (EPHC) agreed to progress the development of nationally consistent guidelines for the environmental assessment and regulation of carbon dioxide and geological storage and to establish a Joint Officials Working Group co chaired by the MCMPR and the EPHC.

Following substantial completion of the exposure draft of the proposed legislation, an IDC meeting was held on 12 November 2007 to provide an overview and invite comment on the exposure draft prior to release for broader public consultation. No significant comments were received.

3. IMPLEMENTING THE REGULATORY PROPOSAL IN COMMONWEALTH WATERS

The 2005 *Regulatory Guiding Principles* highlighted a number of areas which required careful consideration in preparing regulation on carbon capture and storage. Work to implement a regulatory framework identified 12 threshold questions that had to be addressed. Some of these had been addressed in a general sense in the 2005 RIS. Thus, in some cases the questions become ones of what regulation should be used, while in other cases the question of whether regulation is needed also had to be addressed. In its regulatory proposal the Commonwealth has endeavoured to answer these implementation questions in the specific circumstance of Commonwealth waters, while trying to ensure consistency with any eventual State/Territory regime. As was the case when the regulatory principles were first developed, there is little international experience in this type of regulation which is relevant to Australia, so many of these choices have been made from first principles.

The questions were:

- 1) What legislation should be used to provide the access and property rights?
- 2) What management system is needed for the release and award of exploration areas?
- 3) What regulation is needed to manage environmental issues?
- 4) What regulation is needed to manage occupational health and safety issues?
- 5) What regulation is needed for site management, including monitoring and verification, serious situations, and reporting?
- 6) What, if any, regulation is needed in respect of site closure?
- 7) What regulation is needed to manage transport?

- 8) What, if any, regulation is needed in respect of long term liability?
- 9) What, if any, regulation is needed in respect of performance bonds and guarantees?
- 10) What, if any, regulation is needed to manage interactions with the petroleum industry?
- 11) What, if any, regulation is needed to manage interactions with other users of the sea?
- 12) Who should be the regulator?

The issues and the approaches to them are closely interrelated. Thus, for example, the choice of the legislative model is likely to have major implications for the form of much of the required regulation. At a different level, arrangements relating to monitoring and verification will be closely linked to the expected behaviour of the greenhouse gas substance in the reservoir which will dictate in large part the options for dealing with serious situations.

Approaches to these issues are analysed below.

3.1. Legislation

The 2005 RIS concluded that legislation is required to increase industry certainty, increase clarity as to community expectations, increase consistency and transparency and reduce risks to the environment, health and safety.

To implement this conclusion for Commonwealth waters, four options were considered:

- Project specific legislation;
- Stand alone legislation;
- Amendments to the *Offshore Petroleum Act 2006* to provide a legislative framework for greenhouse gas injection and storage;
- Amendments to some other existing legislation.

Handling all the issues requiring legislation in a single framework is desirable. Such an approach will significantly reduce complexity and is consistent with the Guiding Principle of adapting existing systems where possible.

Project specific legislation

Project specific legislation could be developed. However the nature of greenhouse gas storage and injection projects is likely to be such that each one would have to be developed on a case-by-case basis for defined projects. As a result, project proponents would have no certainty as to their future access until after they had undertaken considerable initial exploration. Moreover, there remains the question of under what framework initial exploration activities would be undertaken. Other issues include the time required for new legislation each time a new project was proposed and the very cumbersome arrangements that would be needed to manage

project variations or changes in expected practices. In addition, such an approach would be unlikely to provide for consistent regulation of projects.

This option is not consistent with the use of established legislative and regulatory arrangements as concluded in the guiding principles.

Stand alone legislation

Stand alone legislation is feasible and could provide a clean platform for a regulatory framework which avoids perceptions of the greenhouse gas transport, injection and storage legislation being the province of the petroleum industry.

Stand alone legislation would require a large amount of subordinate regulation relating to issues such as the environment and occupational health and safety compared with the use of an existing platform.

Managing the interactions between the greenhouse gas industry and the petroleum industry will require substantive amendments to the OPA in relation to post-commencement petroleum titles (see section on interactions with the petroleum industry below). Management of these interactions will be greatly simplified if these arrangements are covered by a single regulatory framework.

The use of separate legislation also raises the question of ‘future proofing’ of the regulatory system. It gives less certainty that all matters relating to any future amendments to legislation or regulations dealing with either greenhouse gas activities or petroleum activities, will take the other industry into account.

Stand alone legislation could also be developed as a ‘satellite act’ of the OPA which would allow the many definitions and subsidiary regulation of the OPA to be used, thus addressing the above issues. Such an Act would operate by invoking the OPA for the many definitional issues that arise. However, any company wishing to undertake greenhouse gas transport, injection and storage would have to refer to both Acts, with some matters potentially being addressed in one and some in another. This has the potential to lead to confusion as to which Act applies in specific circumstances, especially in relation to managing interactions with the petroleum industry, where different aspects of many relevant matters would appear in different Acts. The option of a satellite Act was therefore discarded as being cumbersome and potentially inefficient.

Stand alone legislation is not consistent with the conclusion of the 2005 RIS that established legislative and regulatory arrangements should be used wherever possible.

Amendment of the Offshore Petroleum Act 2006

The *Offshore Petroleum Act 2006* (OPA) will replace the existing *Petroleum (Submerged Lands) Act 1967* (PSLA) as soon as certain (minor) State/Territory procedures are completed. This is expected to happen during the first half of 2008.

The existing access and property rights arrangements provided to the petroleum industry through the PSLA have been operating since 1967 and have proven to be

effective and efficient. This is demonstrated through petroleum industry investment in exploration of oil and gas in Australia's offshore areas. It has also proven an effective mechanism for the administration of activities.

Most of the technologies, equipment and techniques used for greenhouse gas injection and storage will be effectively identical to those in common use in the petroleum industry. These include such activities as acquiring seismic data, drilling of wells, and the transport and handling of large quantities of fluids. Offshore petroleum production facilities will also have a great deal in common with offshore greenhouse gas injection facilities, including the basic structural, equipment associated with wellheads and compressors.

Worldwide, the petroleum industry has significant relevant experience, including injection of:

- large quantities of natural gas (predominately methane) either for permanent disposal of natural gas that is produced associated with crude oil in remote areas where there is no market for the natural gas;
- as part of gas recycling projects where natural gas is reinjected to increase the volume of liquids produced;
- carbon dioxide for enhanced hydrocarbon recovery;
- carbon dioxide for disposal.

In engineering terms, such operations are almost identical to the transport and injection of greenhouse gases. However, experience with permanent storage is limited.

The OPA provides a framework which already addresses most of the activities identified as needing regulation above in regards to petroleum. Many of the areas identified by the 2005 RIS as requiring government regulation are very similar to matters dealt with under the OPA in respect of petroleum.

Currently, regulation under the PSLA applies to these activities when undertaken as part of petroleum operations. These regulations under the PSLA relating to petroleum will be replaced with similar regulations under the OPA.

Existing regulation under the PSLA includes:

Petroleum (Submerged Lands) (Management of Well Operations) Regulations 2004
Petroleum (Submerged Lands) (Data Management) Regulations 2004
Petroleum (Submerged Lands) (Management of Safety on Offshore Facilities) Regulations 1996
Petroleum (Submerged Lands) (Occupational Health and Safety) Regulations 1993
Petroleum (Submerged Lands) (Management of Environment) Regulations 1999
Petroleum (Submerged Lands) (Pipelines) Regulations 2001
Petroleum (Submerged Lands) (Datum) Regulations 2002
Petroleum (Submerged Lands) Regulations 1985
Petroleum (Submerged Lands) (Diving Safety) Regulations 2002

Because of the similarity of the industries, these regulations could be extended to regulate identical activities undertaken as greenhouse gas transport, injection and storage operations.

These regulations are currently being reviewed with the aim of consolidation into a lesser number of regulations, removal of any inconsistencies and to streamline approvals processes. The outcome of this review will apply equally to greenhouse gas transport, injection and storage regulation.

Many of the companies undertaking greenhouse gas transport, injection and storage are expected to be petroleum companies, acting either to store greenhouse gases that they have produced or as an agent (or partner) of the generating industry.

Incorporating the amendments into the OPA will increase the length of this already large Act. While the use of the OPA could lead to perceptions that greenhouse gas transport, injection and storage is solely the province of the petroleum industry, it is inevitable that there will be significant interactions between the greenhouse gas injection and storage and the petroleum industries. Bringing all requirements within a single Act will make reference and cross reference easier for users.

Amendments to other legislation

Other legislation that was considered included the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC) and the *Environment Protection (Sea Dumping) Act 1981*.

The EPBC Act may be triggered by projects or activities which are likely to have a significant impact on matters of national environmental significance including the Commonwealth marine environment. Greenhouse gas injection and storage projects could trigger the Act, but some aspects of exploration may not have significant impacts on the environment. The EPBC Act applies to specific environmental matters only and does not provide any basis for an access and property rights regime.

The Sea Dumping Act puts into effect the requirements of the 1996 Protocol to the *London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter* (the London Protocol). The injection and storage of greenhouse gases in offshore areas will require approval under the Sea Dumping Act. However, like the EPBC, it provides no basis for an access and property rights regime.

The *Offshore Minerals Act 1999* could also provide a basis. While it could be used to establish an access and property rights regime, there are few of the synergies that are available from using the OPA.

Amendment of these Acts, therefore, would require new sections which would be effectively indistinguishable from stand alone legislation.

Conclusions

	Potential Disadvantages	Potential Advantages
Project Specific Legislation	Problems of consistency, industry certainty	
Stand Alone Legislation	Requires a new framework for providing access and property rights Will require extensive cross reference to the OPA to manage interactions with the petroleum industry	Single purpose legislation will be shorter
Offshore Petroleum Act	Act becomes very large Could be perceived as making greenhouse matters the province of the petroleum industry	Draws on well established and understood framework for providing and managing access and property rights Provides potential for using much of the same management framework, thus reducing the need for new sets regulations, dealing with what are essentially identical activities Provides for integrated management of any issues relating to integration with petroleum activities
Use different Legislation	No other legislation provides a basis for providing and administering access and property rights	

Recommendation

That the regulatory framework for greenhouse gas transport, injection and storage be implemented by amending the OPA and its attendant regulations to deal with the many aspects of a greenhouse storage project would have in common with petroleum industry operations.

3.2. Management of Release and Award of Exploration Areas

The management and award of exploration areas to prospective greenhouse gas operators was not addressed directly in the 2005 RIS. Nevertheless, any system of access and property rights will need a system to determine who obtains those rights.

Work to date, especially the GEODISC project, has identified areas which may provide suitable storage sites and made an estimate of Australia's potential storage capacity. In some cases, more specific site studies have been undertaken by the Cooperative Research Centre for Greenhouse Gas Technologies (CO2CRC). This pre-competitive geoscientific work provides a starting point for the detailed evaluation of specific sites, which involve data acquisition and analysis, that is needed to prove up sites to the level required.

There are two basic options for allocating areas to prospective greenhouse gas operators so that they can explore for and assess storage sites which they may then use for storage operations:

- direct allocation to potential users based on some criteria such as perceived need;
- some form of competitive process allowing selection of a winning bid.

A competitive process is used for petroleum titles in Commonwealth waters, which commences with the selection of areas for release for bidding by companies wishing to explore that area. Selection is based on the geological potential of the area to contain hydrocarbons, and on taking into consideration possible impacts on environmental values and other activities, such as fisheries, navigation and defence. This process provides a basis for deciding what areas are to be released and what, if any, special conditions may apply. The areas are then released for bids and allocated on the basis of published selection criteria. Bids are assessed in terms of the work program commitments that bidders make and a requirement of the title is that these work programs be met. This process has been in use for many years and is proven and effective.

The OPA also makes provision for the use of cash bidding (which involves bidders tendering a 'cash' amount for the rights to the area). These provisions are rarely used.

A similar process could be used for greenhouse gas exploration titles. It is proposed that allocation would be based on work program bidding or cash bidding in the same way as for petroleum.

Initial screening of areas prior to release will be essential to avoid potentially intractable issues after areas have been awarded. This will be required irrespective of the allocation process chosen to ensure that areas are appropriate and the needs of other users of the sea are taken into account.

An alternative to the competitive bidding processes is the direct allocation of areas to project proponents. This would provide greater certainty to potential greenhouse gas transport, injection and storage proponents at an early stage. However, it is not an open and transparent process and could leave the regulator in the position of being

concerned that the operator is not necessarily the best qualified to assess and operate the site. This lack of transparency would likely lead to strong criticism and claims of discrimination.

This basic model was put forward in the 2006 document *Implementing an Australian Regulatory Framework for Carbon Capture and Storage* and drew a variety of comment from stakeholders.

Some stakeholders have argued that some prospective areas for greenhouse gas storage should be allocated directly to potential greenhouse storage companies. This was put forward as a means of reducing uncertainty about access to sites and to promote a more rapid uptake of greenhouse gas storage technology. Some of these proponents have also argued that, given the need to reduce greenhouse gas emissions, this allocation should be based purely on public interest and possibly over-ride the rights of pre-commencement petroleum titles.

Overall, it is expected that the market, operating in tandem with a bidding system should provide the best results. To capitalise on the investment in assessing a greenhouse storage site, the operator would have a very strong incentive to do business with a greenhouse gas producer (and vice versa).

Substantial further feedback from stakeholders is expected when the exposure draft of the legislation is released.

Conclusion

The advantages and disadvantages of the options are:

	Potential disadvantages	Potential advantages
Competitive bidding process	Less certainty for greenhouse gas storage proponents	Provides a transparent market based process for allocation of areas
Direct allocation of areas	Not a transparent process No assurance that the 'best' potential applicant is awarded the area	Provides greenhouse storage proponents with greater certainty as to access

Recommendation

That the release and award of areas for exploration for greenhouse gas storage sites use a competitive process similar to that used for petroleum.

3.3. Management of the Environment

Environmental risks for an offshore greenhouse gas transport, injection and storage industry will be very similar to those for the petroleum operations. These risks include disturbance of habitat during construction, operation and decommissioning and potential impacts on migratory species. There are also be specialised risks associated with the impact on any leakage of greenhouse gases to the environment, including, for example, the potential impacts of acidification of water. This, however, is offset by the much lower risk of petroleum spills to the environment, compared with the petroleum industry. Ensuring that risks are managed is an essential consideration. This is particularly the case given that the storage of greenhouse gases is a new industry where there is no significant practical experience.

Environmental management was one of the matters considered in the 2005 RIS as part of the assessment and approvals process section. The RIS concluded that a “consistent management approach, which minimises risks associated with CCS processes, should be applied to assessment and approval processes for CCS. This would best be achieved through regulation whereby existing regulation be amended or added to as appropriate ... and provides for similar treatment to other comparable industries.”

In the absence of clear, consistent and transparent environmental management framework, it will be difficult for operators to perform in a way that meets the expectations of the community.

Given that the 2005 RIS concluded that regulation is required, there are two options:

- . Use of arrangements similar to those used for the offshore petroleum industry;
- . Development of new arrangements.

Under existing arrangements for the offshore petroleum industry environmental management is undertaken through the *Environmental Protection and Biodiversity Conservation Act* (EPBC) and the *Environment Protection (Sea Dumping) Act 1981* together with Petroleum (Submerged Lands) (Management of Environment) Regulations 1999. Major offshore projects usually require an impact assessment process. Conditions are usually applied to the project as an outcome of this process. The existing petroleum regulations are outcome focussed and have been designed to promote the adoption of emerging best practice.

Experience of applying these three streams of management in the petroleum industry has resulted in a system which minimises overlaps, while providing an integrated approach to environmental management.

Developing new arrangements would only duplicate existing arrangements. Unless specifically over-ruled, the EPBC Act and the Sea Dumping Act will continue to apply to offshore greenhouse gas, transport and injection projects. No purpose is seen in making such an exception, as they would need to be replaced by equivalent new regulation. Similarly, no useful purpose would be served in replacing the Petroleum

(Submerged Lands) (Management of Environment) Regulations 1999, with a new system for managing environmental issues.

No specific comments have been received from stakeholders on this proposed approach.

There will, however, be a need to address issues relating specifically to the safe and secure storage of CO₂. This is addressed in Section 3.5.

Conclusions

The advantages and disadvantages of the options are:

	Potential disadvantages	Potential advantages
Use of petroleum industry model		Improved efficiency through the use of proven system
Develop new arrangements	Would require duplication of existing arrangements	

Recommendation

That management of environmental impacts (excluding issues relating to the safe and secure storage of the greenhouse gas substance) be done using the existing framework applied to petroleum activities.

3.4. Management of Occupational Health and Safety Issues

There are potential occupational health and safety risks associated with most industrial processes. Greenhouse gas transport, injection and storage is no exception. Occupational health and safety risks for an offshore greenhouse gas transport, injection and storage industry will be very similar to those for the petroleum operations, involving many processes and activities in common. Ensuring that these risks are managed is an essential consideration. This is particularly the case given that the storage of greenhouse gases is a new industry where there is very limited practical experience.

Occupational health and safety was one of the matters considered in the 2005 RIS as part of the assessment and approvals process section. The RIS concluded that a “consistent management approach, which minimises risks associated with CCS processes, should be applied to assessment and approval processes for CCS. This would best be achieved through regulation whereby existing regulation be amended or added to as appropriate ... and provides for similar treatment to other comparable industries.

In the absence of clear, consistent and a transparent management framework, it will be difficult for operators to perform in a way that meets the expectations of the community.

Given that the 2005 RIS concluded that regulation is required, there are two options:

- Use of arrangements similar to those used for the offshore petroleum industry;
- Development of new arrangements.

Existing arrangements for the offshore petroleum industry involve an occupational health and safety process, which is undertaken through the National Offshore Petroleum Authority (NOPSA). NOPSA was established in 2005 to introduce best practice to occupational health and safety outcomes for Australia’s offshore petroleum industry. As part of this process, conditions are usually applied to the project.

Overall, for the greenhouse gas industry, compliance with occupational health and safety requirements is likely to be slightly less onerous than compliance for petroleum operations due to the fact that CO2 is not flammable. However, a minor additional matter for consideration would be that greenhouse gas transport, injection and storage is a new industry and the expertise required to identify any unique features, for example, failure modes, may require the development of expertise not currently held by proponents.

The role of NOPSA could be expanded to include greenhouse transport, injection and storage within its scope of activities.

Any other approach would require additional legislation and regulation covering essentially identical activities and the establishment of a body to undertake the regulation which would require the same skill set as are already available in NOPSA (noting that these skills are both expensive and in short supply). This approach would inevitably lead to increased costs.

No specific comments have been received from stakeholders on this proposed approach.

Conclusions

The advantages and disadvantages of the options are:

	Potential disadvantages	Potential advantages
Use of petroleum industry model		Improved efficiency through the use of proven system
Develop new arrangements	Would require duplication of existing petroleum arrangements Issue of access to expertise	

Recommendation

That management of occupational health and safety issues be done using the existing framework and institutions applied to petroleum activities.

3.5. Management of Storage Sites

Leakage from storage sites poses possible environmental and health risks. It also has the potential to partially negate the purpose of storage which is to prevent emission of greenhouse gases to the atmosphere. In addition, even if no leakage of greenhouse gas to the environment occurs, undesirable migration could impact adversely on other resources, such as petroleum or potable water.

Careful site selection and effective regulatory oversight was identified by the Intergovernmental Panel on Climate Change Report (available from <http://www.ipcc-wg2.org/index.html>) as fundamental to ensuring safe and secure storage. Numerous specialists have also reached the conclusion that, with appropriate site selection and effective monitoring and verification, the probability of leakage is very low. However, the potential scale of costs for remediation could be high. This is also the area where community concerns are likely to be high.

Characterisation and management of storage sites was one of the matters considered in the 2005 RIS as part of the assessment and approvals process section. The RIS concluded that a “consistent management approach, which minimises risks associated with CCS processes, should be applied to assessment and approval processes for CCS. This would best be achieved through regulation whereby existing regulation be amended or added to as appropriate ... and provides for similar treatment to other comparable industries.”

There is no existing regulation that could readily be adapted for this purpose. However, the administration of the offshore petroleum industry involves the approval of field development plans which provides a plan for how the resource will be produced and the field managed.

Given that the 2005 RIS concluded that regulation is required, the issue is one of what type of regulation this should be. There are two basic options:

- The proponent submits a plan to the regulator for approval for managing the site using outcome oriented criteria;
- prescriptive management plans overseen by the regulator.

Prescriptive criteria are not well suited to situations where the circumstances of each individual project are likely to be quite different (for example, different quantities and injection rates, different geology). Each one will need to be considered on a case-by-case basis. What might be an acceptable deviation in the migration path of the injected substance in one case, might pose unacceptable risks in another. Moreover, the lack of practical experience with greenhouse transport, injection and storage projects would make it effectively impossible to develop sensible prescriptive criteria.

An outcome oriented approach to regulation will allow site specific factors to be taken into account and provide a basis for the adoption of emerging best practice.

As a result, an outcome oriented approach is preferred, analogous to that used for offshore petroleum field development plans. Thus, the proposed legislation requires an operator to lodge a comprehensive site plan for approval before activities can proceed. Such a site plan would have to demonstrate, to the satisfaction of the regulator, that the site and its management would result in ‘safe and secure’ storage. The site plan would need to identify risk factors and show that risks had been reduced as low as reasonable practical. The regulator would then have to decide whether these risks, taking into account potential mitigation and remediation strategies, were acceptable.

While this part of a site plan would be large, requiring substantial data acquisition as background, and its analysis, this work would have to be undertaken by any responsible operator, irrespective of whether or not it was required by regulation. As a result, the actual compliance cost would be modest, involving the preparation of the plan in a form acceptable to the regulator (but based entirely on internal work that the operator would have had to undertake in any event) and its submission.

No formal comments have been received from stakeholders on this proposal, but informal discussions have been supportive.

Conclusions

The advantages and disadvantages of the options are:

	Potential disadvantages	Potential advantages
Use of site plan model	Lower certainty as to regulator requirements	Allows for use of objective based regulation Provides flexibility to deal with site specific factors Allows for rapid adoption of best practice and new technologies
Use of prescriptive regulation	Does not provide site specific flexibility Does not allow for improvements in best practice Creates high levels of duty of care responsibilities for the regulator	Better certainty of regulator requirements Simplifies submission and approvals process, but not necessarily outcomes

Recommendation

That a greenhouse gas injection licence not be granted until a project specific site plan is approved by the regulator. The plan should contain detailed modelling of the expected behaviour of the greenhouse gas substance after injection, including the expected migration path or paths.

Monitoring and verification

Monitoring and verification is required to ensure operationally safe performance of greenhouse gas transport, injection and storage projects and must form an integral part of storage site management.

Current scientific understanding indicates that effective monitoring and verification of the stored greenhouse gas substance is a key component for minimising risks.

The 2005 RIS concluded that regulation was required for monitoring and verification to enable “the generation of clear, comprehensive, timely accurate and publicly accessible information that can be used to effectively and responsibly manage environmental, health, safety and economic risks”.

It is envisaged that monitoring should be carried out pre-injection, continuously during injection and for an appropriate period thereafter. Monitoring could involve ambient air monitoring, water monitoring, shallow subsurface monitoring, as well as a range of techniques to monitor the movement of the injected substance in the storage formation. Some monitoring may be continuous, while others might be carried out at intervals, with the frequency depending on site specific factors.

Although projects will be assessed on a case-by-case basis, any monitoring and verification system needs to ensure industry provides accurate and relevant information, which is readily available to the community and independently verifiable.

Effective monitoring can also verify that the amount of greenhouse measured has actually been injected as well as its behaviour over time. In the long-term, monitoring can confirm the continued storage of the injected greenhouse gas substance stream in its intended location or storage formation.

Verification of the methods used in monitoring and the data collected will bring confidence to the process. This is likely to come in the form of operating and reporting standards or objectives that apply to all projects to deliver a high degree of certainty to operators and the community.

Monitoring requirements will be highly dependant on site specific factors and is closely related to the detection of and reaction to any incidents that occur, and hence to mitigation and remediation actions that might be required. For these reasons, it would be most efficient if monitoring was integrated with the site plan. Specifically, the proponent could be required to propose a monitoring and verification plan that satisfied the regulator that any serious events in the reservoir would be detected in a

timely manner. Timely detection of incidents is essential if any remedial or mitigation action is required.

No adverse comments on the form of regulation relating to monitoring and verification have been received in consultations to date. A number of stakeholders, however, have strongly supported the need for such regulation, although there has been no substantive feedback on the form of such regulation.

Environmental management of greenhouse gas projects is also the subject of a Joint Officials Working Group under the Environment Protection and Heritage Council. This work is focussing on onshore jurisdictions as opposed to Commonwealth offshore waters, which is the subject of this RIS. This process will drive national consistency.

Conclusions

Integration of monitoring and verification requirements into the site plan provides the linkage that is needed between different facets of site management. This also provides for an objective based approach to regulation in this area.

Recommendation

That the site plan contain a comprehensive monitoring and verification program to be implemented by the licensee throughout the injection phase and post-injection phase of the project, to ensure that the injected greenhouse gas substance is behaving as predicted or, if it is not, to identify any risks to the environment, safety or other resources.

Remediation and mitigation

If monitoring shows that the storage site is leaking, behaving in way which is likely to lead to leakage to the environment, or impact on other resources, then remediation or mitigation strategies may need to be implemented.

The site plan could provide a basis for establishing remediation and mitigation, which should set out strategies for management of identified risks. Compliance to the site plan, including these aspects, should be a condition of the licence.

Remediation and mitigation strategies could involve very large expenses, for example drilling of wells and injection or extraction of large quantities of fluids. If the injected greenhouse gas substance does behave otherwise than predicted, or looks as though it may do so, the regulator will need to have extensive powers to direct the licensee to take action to eliminate, mitigate or manage any risk posed by the situation, including the suspension or permanent cessation of operations, as well as the taking of action to prevent or remedy any damage that might arise.

Remediation and mitigation strategies will be highly dependant on site specific factors and is closely related to monitoring and verification which provides the mechanism for detecting serious events. For these reasons, it would be most efficient if remediation and mitigation strategies were integrated with the site plan. Specifically,

the proponent could be required to propose remediation and mitigation strategies that satisfied the regulator that any serious events in the reservoir could be managed in an acceptable manner.

No consultations have taken place in relation to the regulation of remediation and mitigation to date, but it will be one of the matters for consideration by stakeholders once an exposure draft of the legislation is released.

Conclusions

Integration of remediation and mitigation strategies into the site plan provides the linkage that is needed between different facets of site management. This also provides for an objective based approach to regulation in this area.

Recommendation

That the site plan specify the safeguard measures that will be implemented to ensure that the injected greenhouse gas substance does not deviate from the expected migration path(s) and does not escape into the atmosphere. This needs to be supported by regulatory powers to direct outcomes in the event that a serious situation occurs.

Reporting

Information will be required on the volume and location of greenhouse gas emissions that have been abated and are stored underground which are accurate enough to meet current and future inventory reporting and commercial requirements; and to engender public confidence.

While reporting was not considered as a separate matter in the 2005 RIS, it is perceived as an integral part of monitoring and verification.

There is a need to develop and establish procedures for carbon dioxide accounting for greenhouse gas storage projects, which include accounting in the event of any leakage of the greenhouse gas substance. These procedures could form the basis of possible future greenhouse gas transport, injection and storage standards, including standards for certification, auditing, management and accounting for stored carbon dioxide. This need will be addressed in the next stage of the process when the detailed regulations are developed.

Reporting is likely to require regular reports of the amount of greenhouse gases stored, together with any losses from the transport and injection processes. Leakage of stored greenhouse gas will be a matter that will need to be considered more broadly under the monitoring and verification and mitigation and remediation powers. While reporting may depend on the requirements of emissions trading scheme and any international obligations, this basic data is likely to meet most requirements.

Under the existing system for the petroleum industry there is a framework of regulatory driven reporting requirements. Overall, however, reporting for the greenhouse gas industry is likely to be no more onerous than the reporting required of

the petroleum industry and consistent with the reports that operators would have to compile to secure abatement permits under any national or international accounting framework.

Conclusions

Reporting requirements will likely involve a degree of prescriptive regulation (for example, frequency of reports and nature of information required) to ensure that reporting arrangements are consistent between projects and with national and international data requirements.

Recommendation

That detailed regulations on reporting requirements be developed, having regard to need of the community to understand fully the fate of the greenhouse gas substance and any requirements that might be imposed through a carbon trading scheme and international reporting obligations.

3.6. Site Closure Process

Scientific advice is that the behaviour of an injected greenhouse gas substance is likely to change markedly once injection ceases, when migration rates may decrease substantially. It will therefore be necessary to continue to monitor the behaviour of the injected substance after injection ceases so that the community can be assured that the greenhouse gas substance is behaving as predicted and not posing any unacceptable risks.

In addition, as part of the site closing process, the licensee will be required to remove or decommission any structures, plant and equipment, to plug any remaining exploration or injection wells and make good any damage to the seabed and subsoil. This requirement is effectively identical to that placed on the petroleum industry.

Post-injection

There are three options for post-injection monitoring prior to site closure:

- undertaken by the operator as part of the obligations under their injection licence;
- undertaken by the regulator using funds provided by the operator for this specific purpose;
- undertaken by the regulator using public funds.

Funding for post-injection monitoring can properly be considered part of the business of greenhouse gas transport injection and storage and government funding could be seen as direct support for the activity. If government support for a project is to be considered it should be through direct funding as this provides much better transparency and certainty. This approach would also raise issues relating to liability.

Similarly, even if funds were provided by the operator to enable the Government to undertake the decommissioning and post-injection monitoring, the Government could still face the situation where it could not be certain if the available funds would be sufficient to meet all costs. This could occur, for example, if the behaviour of the injected substance was not behaving as expected and required additional monitoring or remediation and mitigation. Issues relating to liability are the same as in the previous option.

Requiring the operator to undertake the post-injection monitoring provides a clear and transparent system for managing issues such as liability. Risks would be assumed by industry in a way analogous to any other industrial process. Moreover, the operator will have both the experience and knowledge to undertake activities in the most cost effective manner.

If post-injection monitoring is undertaken by the operator as part of their obligations, the licensee will have to conduct extensive monitoring and verification of the behaviour of the injected greenhouse gas substance, in order that reliable predictions can be made as to its potential migration and interaction with the surrounding geological structures. During this period, the licensee may be required to undertake precautionary or remedial work to prevent or mitigate harmful effects on the geotechnical integrity of the storage site. This will include any necessary measures to avoid damage to natural resources. The objective during this phase will be for the licensee to satisfy the regulator that all reasonable possibilities have been provided for.

The purpose of this work is to enable the regulator to compare predictions of the behaviour of the greenhouse gas substance with actual results, in order to inform future regulatory practice and to ensure that no unforeseen events take place. A site closing certificate would not be issued until a high degree of certainty had been attained.

Once the regulator is satisfied, the title holder may apply for closure, which would result in the surrender of the title.

Post-closure

The three options for post-injection monitoring prior to site closure discussed above also apply to the post-closure phase, but noting that arrangements would have to take into account that statutory obligations would have ceased (see also section 3.8 on long term liability, below).

Under this option (effectively option 2 above, undertaken by the regulator using funds provided by the operator), the licensee would also be required to make financial provision for a program of post-closure monitoring and verification.

No substantive consultations have taken place in relation to the proposed closure process to date, but it will be one of the matters for consideration by stakeholders once an exposure draft of the legislation is released.

Conclusions

The advantages and disadvantages of the options are:

	Potential disadvantages	Potential advantages
Post-injection/pre-closure		
Undertaken by operator as part of their obligations under their injection licence	Period to closure uncertain	Clear and transparent means of addressing liability Risks managed in a similar way to other industries Makes use of operator experience and expertise
Undertaken by the regulator using funds provided by the operator	Liability issues less clear Potential lack of expertise by the regulator Funds may not be sufficient to cover costs	Certainty as to timing for end of statutory obligations Provides an incentive for greenhouse gas operations by reducing uncertainty about future liabilities
Undertaken by the regulator using public funds	Liability issues clear Potential lack of expertise by the regulator Funds may not be sufficient to cover costs Provides government support for project through a non-transparent mechanism	Certainty as to timing for end of statutory obligations Provides an incentive for greenhouse gas operations by reducing uncertainty about future liabilities
Post-Closure		
Undertaken by operator as part of statutory obligations	Cumbersome additional access tenure would be required Does not provide for changes in company circumstances	Clear and transparent means of addressing liability Makes use of operator experience and expertise

Undertaken by the regulator using funds provided by the operator	<p>Potential lack of expertise by the regulator</p> <p>Funds may not be sufficient to cover costs</p>	<p>Certainty as to timing for end of statutory obligations</p> <p>Allows monitoring to continue independent of company circumstances</p> <p>Provides an incentive for greenhouse gas operations by reducing uncertainty about future liabilities</p>
Undertaken by the regulator using public funds	<p>Liability issues clear</p> <p>Potential lack of expertise by the regulator</p> <p>Funds may not be sufficient to cover costs</p> <p>Provides an effective government subsidy through non-transparent mechanisms</p>	<p>Certainty as to timing for end of statutory obligations</p> <p>Allows monitoring to continue independent of company circumstances</p> <p>Provides an incentive for greenhouse gas operations by reducing uncertainty about future liabilities</p>

Recommendation

That post-injection/pre-closure monitoring be undertaken by the operator as part of their obligations under the site closing process, with the operator being required to make financial provision for post-closure long term monitoring after they have vacated the site.

3.7. Transport

Pipelines transporting greenhouse gases will be an integral part of any offshore greenhouse gas injection and storage project. The risks associated with these pipelines will be very similar to those for petroleum pipelines.

The 2005 RIS concluded that gaps in the existing regulatory system be addressed and that amendments/additions to regulatory frameworks for pipelines be extended to explicitly cover pipelines transporting greenhouse gases.

For Commonwealth offshore waters, the OPA and its regulations require only minor amendment to be applicable to the transport of greenhouse gases. These amendments would consist of extending the existing system to apply to greenhouse gas pipelines as well as petroleum pipelines. If this approach is used, then administration would essentially be identical to that of offshore petroleum pipelines.

No other regulation exists in Commonwealth offshore areas for pipelines.

Approaches other than use of the Offshore Petroleum Act would have to duplicate this existing framework if community expectations on issues such as occupational health and safety and the environment are to be met. Such duplication would lead to higher costs through the need to develop new administrative systems.

No substantive comments have been received from stakeholders on this proposed approach.

Conclusions

No existing regulatory framework other than the OPA exists for regulating offshore greenhouse gas pipelines.

Recommendation

That the existing pipeline regime under the OPA be adopted by extending it to apply to greenhouse gas pipelines.

3.8. Long Term Liability

Up until the period to site closure the proposed regulatory system would establish comprehensive statutory responsibilities of title holders with respect to the protection of the environment, other seabed resources and human health and safety in exactly as the same way as for petroleum.

Given the potential timeframes associated with the storage of the greenhouse gas substance as well as the longevity of commercial enterprises, the question of how any long term liabilities would be met arises.

Many commentators and stakeholders have raised the question of liability for the period after site closure. Suggestions have ranged from government assumption of all longer term liabilities to having all liabilities rest with industry in perpetuity. Other suggestions have been for some form of shared responsibility.

The 2005 RIS concluded that that liability should be based on existing regulatory arrangements and common law.

After site closing, there are four options for long term liability:

- no new regulation;
- new regulation under which Government explicitly assumes long term liability;
- new regulation where industry is required to assume long term liability;
- new regulation to share long term liability between government and industry.

No new regulation would involve relying on common law for long term liability. Under this option, greenhouse gas title holders would not be immunised from common law liability to persons who suffer injury or loss as a result of their actions. Nor would their liability be limited. This non-intervention would extend to all forms of common law liability, including long term liability. The Government would therefore not 'take over' long term liability from project participants. Nor would the Government provide any indemnity to project participants in respect of any liability they might incur.

In the long term, the risk would, in a sense, pass to the community because project participants may cease to exist or because of some other time related factor such as availability of witnesses. For example if GHG operations were to result in personal injury or loss to individuals, at a time when there were no project participants still available to be sued, or where damages were for some other reason irrecoverable, the cost would in practice be borne by the community. This would, however, be the consequence of the passage of time, not of any assumption of liability on the part of government. Greenhouse gas industry participants would therefore need to make their own arrangements to deal with potential common law liability, as an ordinary cost of doing business, as must members of any other industry.

Under existing arrangements relating to petroleum, the OPA does not exclude, limit or allocate common law liability of title-holders or others engaged in offshore petroleum operations. Common law liability lies where it falls.

If Government were to explicitly assume long term liability this would effectively be a subsidy. Any subsidies would better be delivered directly rather than through this indirect mechanism which lacks transparency and puts the Government in the position of accepting potential liabilities whose size is highly uncertain. This approach could also establish precedents for government policy in other areas.

New regulation to require industry to assume liability could only realistically involve the establishment of some sort of fund to meet liabilities. No other options are practical given the long term nature of potential liabilities (in the order of thousands of years) and the potential life of industrial participants. This would have the effect of posing additional costs on industry compared with existing law. There would also be a major issue in determining the quantum for contributions to any such fund.

A system could be developed through which industry and government shared long term liability. However, mechanisms for this are unclear and would require significant new law and could set precedents for policy in other areas. In any event, the 'no new regulation' option effectively provides a system where liabilities would be shared between industry and the community, with Government effectively assuming a greater share of liability due to the passage of time.

While many comments have been made on this issue, no consultations have taken place with stakeholders in relation to the proposed approach to date, but it will be one of the matters for consideration by stakeholders once an exposure draft of the legislation is released.

Conclusions

The advantages and disadvantages of the options are:

	Potential Disadvantages	Potential Advantages
No new regulation	<p>Lack of precedents in this industry means that the outcome of common law application remains to be tested</p> <p>Perception that long term liability has not been addressed</p> <p>Potential disincentive to investors</p>	<p>Makes use of existing frameworks</p> <p>Provides incentive to industry to take practical actions to minimise exposure</p> <p>Provides a mechanism by which liabilities would be shared over time</p> <p>Does not set new precedents for government policy</p>
New regulation under which Government explicitly assumes long term liability	<p>Government exposure to future costs unclear</p> <p>Incentive provided in a non-transparent manner</p> <p>Could set precedents for government policy in other areas</p> <p>Incentive for industry to take practical actions to minimise exposure unclear</p>	<p>Provides an incentive to project investors</p>
New regulation where industry is required to assume long term liability	<p>Could impose higher costs than necessary on industry through the need to contribute to a fund which would be held in perpetuity</p> <p>Issue of determining appropriate level of contribution to a fund</p>	<p>Incentive for industry to take practical actions to minimise exposure</p>
New regulation to share long term liability between government and industry	<p>Unclear as to how liabilities could be shared</p>	<p>May provide an incentive to industry to take practical actions to minimise exposure</p>

Recommendation

That there be no new regulation and the issue of long term liability be left to common law in the same way as it does for petroleum and other industries.

3.9. Bonds and Guarantees

Experience with the mining industry, both in Australia and internationally, has demonstrated that there is a significant risk that commitments to undertake certain works, especially decommissioning and site rehabilitation may not be undertaken. This can arise when, for example, a company ceases operations and has no remaining resources to fund the necessary work. Such risks can be faced during any phase of a project. For example, exploration activities may result in the need for rehabilitation activities. Risks may also be posed during operation as a result of earlier than planned termination, as well as at the end of planned project life.

As a result, it is common practice in the Australian on-shore mining and petroleum industries to require financial bonds or guarantees for site rehabilitation. Such bonds and guarantees are also normal practice internationally. These bonds or guarantees are usually required from the commencement of the project and the amount reviewed during the project to take account of any changes that occur. Bonds and guarantees have not been required of the Australian offshore petroleum industry because of the nature of the industry involved (large companies with the resources to undertake any decommissioning and site rehabilitation required and their need to maintain their social licence to operate). This situation, however, is kept under review and may change in the future if industry structure changes to pose significant risks that such activities will not be undertaken adequately.

In assessing the need for securities there is a need to take into account that this is a new industry where there is a relatively high degree of uncertainty about risks and an array of potential company ownership, structures and sizes involved. Thus it is prudent to provide for the possibility of bonds and guarantees to ensure that funding is available for key activities. To avoid the situation of always requiring bonds or guarantees, it is preferable that the need be assessed by the regulator on a case-by-case basis. This will minimise overall costs.

A mandatory requirement for bonds and guarantees inevitably results in a 'lowest common denominator' approach with all companies being required to enter into arrangements, irrespective of the need in their specific case. Leaving it to the regulator's discretion reduces the number of bonds and guarantees that will be sort, thus lowering overall compliance costs.

On the other hand, the ability to be able to decide the level, if any, of a security required on a case-by-case basis may lead to perceptions of bias. Clear guidelines on security assessment criteria will need to be developed to ensure transparency.

No substantive comments have been received form stakeholders on this proposed approach.

For long term monitoring after site closure, it is likely that a bond or guarantee would be required in nearly all circumstances. This reflects the long term nature of such monitoring and the need maintain certainty as to migration and potential impacts.

No substantive comments have been received from stakeholders on the issue of bonds and guarantees.

Recommendation

That regulatory provision be made for bonds and guarantees to be requested at the discretion of the regulator.

3.10. Interactions with Petroleum

Effectively all of Australia's offshore areas that may be attractive for greenhouse gas injection and storage are the subject of existing petroleum titles. Over time, some of these will be relinquished and become vacant. The greenhouse gas transport, injection and storage industry will need to be able to access areas which overlap petroleum titles. Without this overlap no significant areas would be available for greenhouse gas injection and storage. In most cases, petroleum and greenhouse gas activities will be able to co-exist. It is possible, however for greenhouse gas activities to impact negatively on petroleum operations. This could occur, for example, through migration of the greenhouse gas into a petroleum pool and displacing the petroleum, making it effectively unrecoverable and/or leading to materials incompatibility problems with existing petroleum production equipment. Similarly future petroleum operations could impact negatively on an established greenhouse gas operation. Thus a system is required to manage circumstances where the activities could impact negatively on one another. Without such a system both industries would face greater uncertainty to access rights which would be counter to the guiding principles.

There are potential advantages for both the greenhouse gas and petroleum industry in working in the same area. For example, information gained by one activity may have significant commercial value for the other.

The issue of interactions with petroleum was not addressed in the 2005 RIS.

Pre-commencement petroleum titles

It is a policy imperative that the rights of pre-commencement petroleum title holders (that is those titles that are in force before the greenhouse gas regulatory framework is put in place) are preserved. Impinging on these rights would create increased sovereign risk with the likely result of reduced petroleum activities in Australian waters.

Options to avoid adverse impacts on pre-commencement titles include:

- avoiding areas covered by pre-commencement petroleum titles;
- allowing greenhouse gas operations to proceed only with the agreement of the petroleum title holder;

- requiring greenhouse gas proponents to demonstrate that they will have no significant impact on petroleum operations.

As already discussed, avoiding areas covered by pre-commencement titles effectively means that no areas would be available for greenhouse operations. A system of overlapping titles is therefore necessary.

However, the options of no significant adverse impact and commercial agreements can be combined. Under this option, greenhouse gas operations could proceed when there was a commercial agreement between the two industry title holders. In the absence of such an agreement, greenhouse gas operations could only proceed if the greenhouse gas proponent could demonstrate that there would be no significant adverse impact on the pre-commencement petroleum title holder's rights.

In the event that a greenhouse gas proponent is unable to reach a commercial agreement with a petroleum title holder, they will face significant risks in their ability to operate. Prospective greenhouse gas title holders, however, will be in a position to evaluate these risks before making any investment decisions.

This framework was proposed in the 2006 document *Implementing an Australian Regulatory Framework for Carbon Capture and Storage* and drew a variety of comment from stakeholders. The petroleum industry expressed concern that it might not do enough to protect their existing rights, while some greenhouse gas proponents perceived it as giving the petroleum industry a 'veto' power over their operations. Both groups noted that they needed more detail on how this framework would be implemented.

This issue is expected to attract significant feedback when the exposure draft is released for stakeholder comment and is closely related to the issue of managing release and award of exploration areas discussed in Section 3.2 above.

Recommendation

That, in the absence of an agreement between the parties, the rights of pre-commencement petroleum title holders be protected by requiring greenhouse transport, injection and storage operators demonstrate to the satisfaction of the regulator that their activities will not have a significant negative impact on petroleum operations.

Post-commencement titles

For post-commencement titles the imperative to protect existing rights is no longer an issue. Nevertheless, it is important to ensure that the system developed is not perceived by the petroleum industry as putting major obstacles in the way of future offshore petroleum operations. Such a perception would make it more difficult for Australia to attract the highly mobile petroleum exploration budget of major petroleum companies, with significant implications for future discoveries of petroleum.

Options available include:

- giving one industry (either petroleum or greenhouse gas) precedence over the other;
- giving precedence to whichever industry was first granted a title in the area in question;
- allowing a decision to be made by the government as to which industry should proceed based on the specific circumstances of the case in situations where both industries cannot co-exist;

Giving precedence to one industry (the ‘preferred industry’ option) over the other (that is, petroleum always preferred or greenhouse gas always preferred) raises the risk that major opportunities in one industry will be foregone in return for a lesser opportunity in the other. In addition, it would increase the perceived sovereign risk for whichever industry was not favoured. Against this, the other industry would have greater investment certainty. This approach also has the disadvantage that it does not allow for flexibility if the relative importance of petroleum and greenhouse gas operations change.

Giving whichever industry was first awarded a title (the ‘first-in-first-served’ option) also raises the risk that major opportunities in one industry will be foregone in return for a lesser opportunity in the other. This approach also has the disadvantage that it does not allow for flexibility if the relative importance of petroleum and greenhouse gas operations change. It does, however, have the advantage that it increases certainty for the first industry established.

Allowing the regulator to make decisions on which industry should proceed in cases where they cannot co-exist allows the relative merits of the two competing opportunities to be taken into account (the ‘public interest’ model). It also allows for flexibility if the relative importance of petroleum and greenhouse gas operations change. It also enables commercial agreements between the parties to be taken into account, which could lead to acceptable compromise solutions. This could be done through a public interest test¹ in which the regulator would consider the relative merits of the two competing proposals. Criteria could include social, economic and environmental factors.

However, to provide confidence to investors it would be necessary to limit this test to titles earlier in the series than production licences or injection licences, after which point title holders could be making large investments. Thus, once an injection licence or production licence has been granted, the other industry would have to demonstrate no significant adverse impact, in the same manner as is done for pre-commencement petroleum titles.

Management of this system will require that certain post-commencement petroleum titles (that is those that overlap a greenhouse gas title) are identified and operators are

¹ As noted in Section 1, the guidelines for such a test are yet to be decided, and will be considered further following public consultation.

required to inform the regulator of proposed activities so that the regulator can then inform the greenhouse gas title holder and ensure that activities can co-exist. Greenhouse title holders (except for holders of injection licences) will have to be placed under a similar obligation.

The difference between these options in terms of administrative requirements is negligible. In a ‘preferred industry’ or ‘first-in-first-served’ option the reduced compliance costs on the first industry in will be counterbalanced by increased compliance costs for the second.

The framework proposed in the 2006 document *Implementing an Australian Regulatory Framework for Carbon Capture and Storage* contained the public interest test option. Only limited feedback on this aspect was provided by stakeholders, although one informal comment was that the increased certainty offered by the first-in-first-served model could outweigh the flexibility offered by the public interest model.

Further feedback is expected when the exposure draft is released for stakeholder comment.

Conclusion

The advantages and disadvantages of the options are:

	Potential disadvantages	Potential advantages
Preferred industry option	<p>Reduced certainty for the non-preferred industry</p> <p>No ability to decide which industry represents the most important opportunity</p> <p>Limited basis for commercial agreements between industries</p>	<p>Increased certainty for the preferred industry</p>
First-in-first-served option	<p>Reduced certainty for the second industry to enter the area</p> <p>No ability to decide which industry represents the most important opportunity</p> <p>Limited basis for commercial agreements between industries</p>	<p>Increased certainty for the second industry to enter the area</p>

Public interest model	Reduced certainty for industry	Increased flexibility to allow the most 'valuable' development opportunity to proceed Provides a basis for commercial negotiations between industries
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Recommendation

That, in the event that activities cannot co-exist, post-commencement petroleum titles and greenhouse gas titles be prioritised using a public interest test.

3.11. Other Users of the Sea

Other users of the sea include fisheries, marine transport, communications and defence. Greenhouse gas activities have the potential to impact on the users through environmental impacts affecting fisheries and through the physical presence of structures (for example impacts on fishing trawling, the hazard to navigation represented by fixed structures, and access to defence practice areas. All these potential impacts are essentially identical to those posed by petroleum operations. The OPA protects these rights by requiring other users to be taken into account in the process and demonstrating that impacts have been minimised to the extent practical. In practice, the first stage in managing potential impacts is through stakeholder consultation when deciding on areas to be released for exploration (see Section 3.2). This process may lead to special conditions being applied to the area in question.

An identical approach is proposed for the greenhouse gas transport, injection and storage industry which will have almost identical impacts on other users of the ocean.

No consultations have taken place in relation to the proposed approach to date, but it will be one of the matters for consideration by stakeholders once an exposure draft of the legislation is released.

Recommendation

That the rights of other users of the sea be managed in the same way as for the petroleum industry.

3.12. The Regulator

Given that there will be a large number of areas in the regulatory framework which will require decisions or approvals by a regulator (sections 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.9, 3.10 and 3.11 above, the question arises of who should be responsible for these tasks.

This issue was not addressed in the 2005 RIS or the 2006 discussion paper.

There are two basic options:

- the existing Joint Authority/Designated Authority (JA/DA) model used for petroleum, whereby day-to-day decisions are delegated to the States/Territories;
- administration by the Australian Government (that is the responsible Commonwealth Minister).

Administration through the JA/DA model has the advantages

- use of existing administration systems;
- close involvement with the day-to-day administration of petroleum could provide synergies for managing greenhouse gas activities;
- ensuring close involvement with the States/Territories on projects that are likely to be relevant to their interests.

Administration by the Australian Government is feasible because of the small number of potential projects and also provides a number of advantages.

- it will provide greater national consistency, which will be particularly important given that this will be a new industry and many regulatory approvals in the early stages of the scheme will be setting precedents for future decisions;
- not all jurisdictions have the expertise or want the responsibility for managing greenhouse gas operations;
- given that projects will be in offshore waters under Commonwealth legislation, delegation of decision making powers to the States/Territories could lead to additional complexity if the issues arise relating to long term liability.

Because many of the day-to-day regulatory matters are essentially identical to those in the petroleum industry, there is an opportunity to under the central administration model for States/Territories to be contracted to undertake these regulatory activities on behalf of the Australian Government. This will address any issues that might arise from the need to develop new expertise in the Australian Government which could duplicate existing State/Territory expertise.

Close involvement with the States/Territories on major projects can be addressed through existing consultative processes, including the Ministerial Council on Minerals and Petroleum Resources and its sub-committees.

An element of greenhouse gas activities more suited to the JA/DA regulation model relates to pipelines. This approach would be well suited because all known potential greenhouse gas pipelines associated with offshore storage projects will traverse areas of State/Territory jurisdiction as well as Commonwealth waters. Leaving pipeline

administration under current arrangements will provide for better coordination of decision making than applying the Australian Government model.

Occupational health and safety is another area that is more suited to using the existing regulator, that is, the National Offshore Petroleum Safety Authority (see Section 3.4).

The proposal has been discussed with States and Territories. Some are supportive, while others have expressed some reservations. Wider consultation on this proposal will take place when the exposure draft of the legislation is released for comment.

Conclusion

The advantages and disadvantages of the options are:

	Potential disadvantages	Potential advantages
JA/DA Model	<p>Potential to reduce national consistency, especially in relation to ‘first time’ decisions which will set precedents for future decisions</p> <p>Not all jurisdictions have the expertise or want the responsibility for managing greenhouse gas operations</p> <p>Potential for greater complexity if issues arise relating to long term liability</p>	<p>Use of existing administration systems</p> <p>Close involvement with the day-to-day administration of petroleum could provide synergies for managing greenhouse gas activities</p> <p>Ensures close involvement with the States/Territories on projects that are likely to be relevant to their interests</p>
Administration by the Australian Government	<p>Does not provide the synergies that might arise from the close involvement with the day-to-day administration of petroleum industry</p> <p>May reduce involvement with the States/Territories on projects that are likely to be relevant to their interests</p>	<p>Potential to increase national consistency, especially in relation to ‘first time’ decisions which will set precedents for future decisions</p> <p>Overcomes the issue of not all jurisdictions having the expertise or wanting the responsibility for managing greenhouse gas operations;</p> <p>Simpler if issues arise relating to long term liability;</p>

Overall, the advantages of Australian Government administration are considered to outweigh those of the JA/DA approach. It will however, require processes to be put in place for liaison with States/Territories.

Recommendation

That regulation of greenhouse gas injection and storage activities in Commonwealth waters be undertaken by the responsible Commonwealth Minister, with the exceptions of pipelines, which would be administered under the existing JA/DA model and occupational health and safety which would be administered by NOPSA.

4. COMPLIANCE COSTS

The operator of a greenhouse gas sequestration title will face many compliance costs analogous to the operation of offshore petroleum titles. Lodgement of documents, compilation of plans, requests for permission and record keeping are expected to be broadly consistent with that under the OPA. In the absence of detail on regulation and guidelines, it is impossible to quantify such costs at this stage with traditional tools such as the OPBR Business Cost Calculator.

While the costs of compliance under the Offshore Petroleum Act have not been quantified, the recent revisions to this regulatory framework – which have been adopted in the geosequestration provisions – were intended to lower the costs of compliance from the *Petroleum (Submerged Lands) Act 1967*. Similarly, moves toward objective based regulation for petroleum were intended to allow industry to seek least cost solutions to compliance. This approach is central to the site management plan in the geosequestration amendments, and is proposed to be retained under future regulations and amendments appropriate to geosequestration.

Many of the requirements of the regulator are costly but not *additional* to work which would be carried out by titleholders as a routine part of designing and executing and managing an offshore geosequestration operation. For example, highly detailed modelling of the subsurface behaviour which is essential for a site plan, should also be a regular part of the work which would be done by the company for its own commercial purposes. As long as administration is directed towards minimal duplication and consistency of requirements, as is done in offshore petroleum, there should be no undue burden to preparing submissions for the regulator.

An important aspect of reducing compliance costs will be to establish the guidelines which give detail, particularly on procedural matters, and to establish experience in both industry and the Commonwealth Government in administering this industry. Given the infancy of the geosequestration industry, and the lack of international models, in some areas (eg. the application of a public interest test), the proposed legislation gives wide ranging powers to the Responsible Commonwealth Minister rather than prescribes complex decision making rules. If this balance is not correct, there is a risk that the potential cost of compliance will be a disincentive to investment in geosequestration. As this is difficult to determine *a priori*, this issue will need to be reassessed prior to titles being awarded.

However, despite the initial uncertainty which will accompany any new regulatory regime, there is an expectation that the choice of a single regulator will lower the cost of compliance in the long term. At present, offshore petroleum titles may pass through complex and repetitive assessments between State/NT and Australian Governments,

and industry has been critical of delays and differences in interpretation between jurisdictions. The establishment of the Australian Government as the sole regulator is expected to shorten approval timeframes and costs and minimise the opportunities for disputes.

Compliance costs in relation to managing interactions with the petroleum industry should also be modest as analysis of possible impacts will naturally arise out of the detailed analysis of the suitability of potential sites. The main impact in this context relates to industry certainty. This issue, however, will be known by potential investors from the outset and can be taken into account in their decision making process.

There may also be some compliance costs for holders of post-commencement petroleum titles. However this is likely to affect a very small number of petroleum title holders and again the compliance costs should be limited.

5. REVIEW

The Government's proposed regulatory model will be reviewed by the Responsible Commonwealth Minister in the light of feedback collected by the Department of Resources, Energy and Tourism on the exposure draft of the legislation.

If the proposed legislation moves into law, it is expected to be required indefinitely so will not be subject to a sunset clause. Review is expected to continue on an ad hoc basis and also to be subject to the Government's general policy of five yearly reviews, as in the case of current petroleum legislation. The MCMPR has formally committed to a review of its guiding principles by 2010, which will be used to assess issues associated with the implementation of the offshore legislation.

The Department of Resources, Energy and Tourism will establish a single point of contact for any inquiries or feedback related to the operation of the regulation. This will include a web presence and regular e-mail newsletter to interested parties encouraging feedback on general and specific issues.

Regular reports will also be made to State and Commonwealth officials under the MCMPR on issues associated with the amendments.

6. CONCLUSIONS

In application of the 2005 Regulatory Principles to Commonwealth Waters, it is proposed that:

- That the regulatory framework for greenhouse gas transport, injection and storage be implemented by amending the *Offshore Petroleum Act 2006* and its attendant regulations to deal with the many aspects of a greenhouse storage project would have in common with petroleum industry operations.
- That the release and award of areas for exploration for greenhouse gas storage sites use a competitive process similar to that used for petroleum.

- That management of environmental impacts (excluding issues relating to the safe and secure storage of the greenhouse gases substance) be done using the existing framework applied to petroleum activities.
- That management of occupational health and safety issues be done using the existing framework and institutions applied to petroleum activities.
- That a greenhouse gas injection licence not be granted until a project specific site plan is approved by the regulator. The plan should contain detailed modelling of the expected behaviour of the greenhouse gas substance after injection, including the expected migration path or paths.
- That the site plan contain a comprehensive monitoring and verification program to be implemented by the licensee throughout the injection phase and post-injection phase of the project, to ensure that the injected greenhouse gas substance is behaving as predicted or, if it is not, to identify any risks to the environment, safety or other resources.
- That the site plan specify the safeguard measures that will be implemented to ensure that the injected greenhouse gas substance does not deviate from the expected migration path(s) and does not escape into the atmosphere. This needs to be supported by regulatory powers to direct outcomes in the event that a serious situation occurs.
- That detailed regulations on reporting requirements be developed, having regard to need of the community to understand fully the fate of the greenhouse gas substance and any requirements that might be imposed through a carbon trading scheme and international reporting obligations.
- That the existing pipeline regime under the OPA be adopted by extending it to apply to greenhouse gas pipelines.
- That post-injection/pre-closure monitoring be undertaken by the operator as part of their obligations under the site closing process, with the operator being required to make financial provision for post-closure long term monitoring after they have vacated the site.
- That there be no new regulation and the issue of long term liability be left to common law in the same way as it does for petroleum and other industries.
- That regulatory provision be made for bonds and guarantees to be requested at the discretion of the regulator.
- That, in the absence of an agreement between the parties, the rights of pre-commencement petroleum title holders be protected by requiring greenhouse transport, injection and storage operators demonstrate to the satisfaction of the regulator that their activities will not have a significant negative impact on petroleum operations.

- That, in the event that activities cannot co-exist, post-commencement petroleum titles and greenhouse gas titles be prioritised using a public interest test.
- That the rights of other users of the sea be managed in the same way as for the petroleum industry.
- That regulation of greenhouse gas injection and storage activities in Commonwealth waters be undertaken by the responsible Commonwealth Minister, with the exceptions of pipelines which would be administered under the existing JA/DA model and occupational health and safety which would be administered by NOPSA.

These policy decisions have been translated into draft legislation for further stakeholder comment.

The proposed legislative framework involves the extension of existing petroleum regulations under the OPA to apply to greenhouse gas activities, and new regulations to cover those aspects of greenhouse gas transport, injection and storage activities where existing petroleum regulation is not appropriate. However, the overall framework establishes the broad direction and structure of many of these regulations.

Next Steps

The next stage in the process is to release the Bill as an exposure draft for comments from stakeholders to obtain more detailed feedback on the framework. Following consideration of comments from stakeholders it is envisaged that the Bill will be amended, if necessary, and introduced into Parliament.

Regulations and guidelines to cover things such as public interest tests, impact significance tests, assessments and approvals, monitoring and verification, financial issues and post-closure responsibility remain to be developed. While those used for regulating the offshore petroleum industry provide a useful starting point for many of these instruments, it appeared inappropriate to pursue this level of detail without first soliciting clearer feedback from stakeholders on the proposed legislative amendments. As a consequence, many issues relating to the final cost of regulation also cannot be assessed at this stage.

The final stage in the process will be the development of the associated regulations and guidelines. The development of these regulations and guidelines will require further consultation with relevant stakeholders. A further RIS will be undertaken on the regulations and guidelines, at which stage a clearer picture of costs and benefits will be provided.