

The Senate

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Standing Committee on Economics

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Offshore Petroleum Amendment (Greenhouse Gas Storage) Bill 2008 [Provisions]

Offshore Petroleum (Annual Fees) Amendment (Greenhouse Gas Storage) Bill 2008 [Provisions]

Offshore Petroleum (Registration Fees) Amendment (Greenhouse Gas Storage) Bill 2008 [Provisions]

Offshore Petroleum (Safety Levies) Amendment (Greenhouse Gas Storage) Bill 2008 [Provisions]

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# Senate Standing Committee on Economics

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# Chapter 1

## Background to the bill and conduct of the inquiry

1.1 On 18 June 2008, the Minister for Resources and Energy, the Hon Martin Ferguson MP, introduced the Offshore Petroleum Amendment (Greenhouse Gas Storage) Bill 2008 into the House of Representatives. As part of the consultation process associated with the introduction of the bill, the Minister asked the House of Representatives Standing Committee on Primary Industries and Resources to conduct an inquiry into the provisions of the draft bill. The Committee reported on 15 August 2008.<sup>1</sup>

1.2 On 25 June 2008, the Senate referred the provisions of the Offshore Petroleum Amendment (Greenhouse Gas Storage) Bill 2008 and three related bills to the Standing Committee on Economics for report and inquiry. The committee was asked to report by 16 October 2008.

1.3 In requesting the bills be referred to the Economics Committee, the Selection of Bills Committee was particularly concerned that the bill shifts liability for leakage of CO<sub>2</sub> from geological storage from the large greenhouse gas emitters to the public:

The long-term cost of unforeseen leakage of carbon dioxide from geological storage could be very substantial. This legislation shifts the liability for such leakage from the large greenhouse gas emitters who may use geological storage, to the public. Given the uncertainty about the permanence of geological storage the Senate needs to carefully consider these liability risks.<sup>2</sup>

1.4 On 25 June 2008, the Standing Committee for the Scrutiny of Bills Committee also raised concerns in respect of the bill. These concerns related to the failure of the explanatory memorandum to explain adequately the intent and operation of numerous provisions in the bill. Of particular concern were the commencement clauses and the provisions that create offences of strict liability.<sup>3</sup>

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1 In the report, *Down Under: Greenhouse Gas Storage*, the committee sought to strike a balance between the existing rights of petroleum title holders and those of organisations holding the new greenhouse gas storage titles. The House Committee agreed with the Government that 'the similarities and synergies in the petroleum and GHG storage industries make common legislation appropriate' but advocated that financial incentives be considered to encourage early investors into offshore storage of CO<sub>2</sub> (p. 11). It noted that petroleum companies may be best placed to operate such storage operations.

2 Selection of Bills Committee, *Report No. 6 of 2008*, 25 June 2008, Appendix 1.

3 Standing Committee for the Scrutiny of Bills, *Alert Digest 6/08*. Strict liability is a legal doctrine that makes a person responsible for the damage and loss caused by his/her acts and omissions regardless of culpability (or fault in criminal law terms).

1.5 As the House of Representatives Standing Committee on Primary Industries and Resources' report has already canvassed extensively a range of issues, this report concentrates on a closer examination of these key issues. The first chapter provides an outline of the purposes of the bill and discusses the regulatory framework for greenhouse gas injection and storage in Commonwealth offshore waters. Chapter 2 provides some background information on the science and economics of offshore CO<sub>2</sub> storage. Chapter 3 investigates the provisions contained within the bill for regulating the offshore CO<sub>2</sub> storage market and Chapter 4 examines the question of liability. The final chapter of the report provides conclusions and recommendations.

### **Purpose of the bill**

1.6 The bill provides for access and property rights for greenhouse gas injection and storage activities in Commonwealth offshore waters. It applies to titles which will be located in the area between the outer limits of the states' coastal waters (i.e. 3 nautical miles from the shore) and the outer limit of the continental shelf.<sup>4</sup> The bill amends the *Offshore Petroleum Act 2006* to establish a system of offshore titles that will authorise the transportation, injection and storage of greenhouse gas (GHG) substances, principally carbon dioxide (CO<sub>2</sub>), in deep geological formations under the seabed.<sup>5</sup> To achieve this aim, the bill changes the existing regime of petroleum titles in order to accommodate the new kinds of activity being authorised by the Act. Accordingly, the legislation seeks to balance the rights of new participants in the industry with those of the petroleum industry. The legislation also seeks to provide a regulatory and management system for carbon dioxide to be stored safely and securely in geological storage formations deep underground in Australian offshore waters under Commonwealth jurisdiction.

1.7 The bill emerges at a time when Australia looks to lower substantially its greenhouse gas emissions. As such, it represents one part of a broader legislative commitment to reducing the impact of climate change, including legislation related to a proposed carbon emissions trading scheme.

1.8 As a country which obtains 80 per cent of its electricity from coal-fired power stations and exports somewhere in the vicinity of 30 per cent of the world's coal, it is incumbent upon Australia to reduce the amount of CO<sub>2</sub> it releases into the atmosphere.<sup>6</sup> Carbon capture and storage (CCS), or geosequestration, may prove an effective mechanism for significantly reducing Australia's greenhouse gas emissions.

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4 Offshore Petroleum Amendment (Greenhouse Gas Storage) Bill 2008, *Explanatory Memorandum*, paragraph 5.

5 Initially the bill will authorise the injection and storage of a 'greenhouse gas substance', primarily carbon dioxide. However, the possibility of expanding the scope of operations to other greenhouse gases is incorporated into the bill, for example, SO<sub>2</sub>, N<sub>2</sub>O, methane and nitrogen accompanying the CO<sub>2</sub>.

6 Ms Helen Oakey, Greenpeace Australia, *Proof Committee Hansard*, 29 August 2008, p. 2.



1.9 Along with other mitigation measures, CCS could significantly reduce the costs of stabilising greenhouse gas concentrations. Potentially, CCS technology would allow Australia to continue to draw upon its fossil fuels, which are used for electricity generation and a variety of industrial purposes, without significant emissions of greenhouse gases into the atmosphere.

1.10 If Australia is to develop its CCS potential, it faces a series of regulatory, legal, economic and technical changes. The IEA's Carbon Sequestration Leadership Forum describes the challenge as related to the 4 'Ps':

- **Policy:** government policies are needed to encourage, not inhibit CCS deployment e.g. efficient permitting processes; project incentives; long-term liability for stored CO<sub>2</sub>;
- **Price:** a price will have to be established for CO<sub>2</sub> if CCS is to be deployed widely; the cost of CCS will need to come down significantly;
- **Partnerships:** arrangements between CO<sub>2</sub> producers, transporters, storage providers, host communities and governments to enable CCS raises challenges. This may require new forms of partnerships;
- **Public Acceptance:** awareness of CCS is almost non-existent. Gaining public acceptance is critical to widespread CCS deployment.<sup>7</sup>

1.11 However, it is not the intent of the proposed legislation to create drivers for CCS uptake. Rather, the legislation provides an enabling framework in which greenhouse gas storage may be undertaken.

1.12 The decision to use the *Offshore Petroleum Act 2006* (OPA) as the legislative basis for CCS storage was based on the technical similarities between petroleum exploration and extraction and GHG storage. The OPA was also chosen as it was considered a mechanism for managing the interactions between the two activities within a consistent regulatory framework.

1.13 In evidence to the committee, the Department of Resources, Energy and Tourism explained why the OPA allows for the establishment of an effective regulatory framework for greenhouse gas injection and storage:

The framework for our proposed legislation is primarily based on the carbon dioxide capture and geological storage regulatory guiding principles endorsed by the Ministerial Council on Mineral and Petroleum Resources in 2005. Those guiding principles provide nationally agreed upon recommendations on how to manage critical elements of any carbon capture and storage legal system, including access and property rights, approvals processes, transport and financial considerations. It was the ministerial

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7 International Energy Agency, 'Near-term opportunities for carbon dioxide capture and storage: issues identification workshop', OECD/IEA, 2007, p. 5.

council which endorsed the use of the *Offshore Petroleum Act 2006* as the most appropriate platform on which to develop this legislation. The reason that this was agreed to is to allow for the establishment of a consistent, longstanding and effective framework for greenhouse gas injection and storage activities to ensure that both the existing petroleum industry and the newly emerging greenhouse gas injection and storage industry can co-exist.<sup>8</sup>

## Nationally consistent legislation

1.14 This pioneering legislation will see Australia the first country in the world to establish a specific legislative framework for CCS. In its submission, the Australian Petroleum Production & Exploration Association suggested the legislation will:

...make Australia one of the first jurisdictions to develop a comprehensive legislative and regulatory framework for greenhouse gas (ghg) injection activities.<sup>9</sup>

1.15 ExxonMobil also referred to the pioneering nature of the legislation:

The vast majority of existing law around ownership and access to underground resources is based on extractive uses such as oil and gas production and mining. There is very little law (statutory or case) regarding ownership of other geologic pore space.<sup>10</sup>

1.16 In observing the current state of legislative and technological advancement in Australia, the abovementioned IEA Carbon Sequestration Leadership Forum report claims:

Australia is a leader in the science and technology of geosequestration and perhaps the most advanced in terms of the legislation. One of the lessons from current projects is that regulatory trail-blazing is difficult and time consuming.<sup>11</sup>

1.17 The complexities involved in the establishment for a framework of nationally consistent legislation are significant, particularly when one considers the planning, environmental and property law that may be involved in establishing the pipeline required for large-scale CO<sub>2</sub> transportation. Yet, in spite of this complexity, efforts are being made to establish a nationally consistent approach to infrastructure investment in CO<sub>2</sub> transportation.<sup>12</sup>

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8 Ms Margaret Sewell, Department of Resources, Energy and Tourism, *Proof Committee Hansard*, 29 August 2008, p. 8.

9 Australian Petroleum Production & Exploration Association, *Submission 11*, p. 2.

10 ExxonMobil, *Submission 1*, p. 11.

11 International Energy Agency, 'Near-term opportunities for carbon dioxide capture and storage: issues identification workshop', OECD/IEA, 2007, p. 10.

12 For a discussion of the need for a national infrastructure plan see evidence presented by the Victorian government, *Proof Committee Hansard*, 29 August 2008, p. 24.

1.18 While the proposed legislation is concerned with Australian offshore waters, which are under Commonwealth jurisdiction, the retrieval, conversion and transport of CO<sub>2</sub> may take place in the states and territories, prior to sequestration.

1.19 In explaining the current status of CCS legislation in Australia, the Department of Resources, Energy and Tourism explained:

At the moment, the Commonwealth legislation is the first legislation that has been introduced into a parliament around Australia. Queensland and Victoria are fairly advanced in their own legislation. South Australia is amending its Petroleum Act rather than doing stand-alone legislation. But CO<sub>2</sub> storage is already allowed in South Australia in existing oil and gas title areas...We have tried to deal with the potential interactions between the oil and gas industry and the greenhouse gas storage industry in particular while acknowledging that there are potential interactions with the fishing industry in relation to pipelines and the location of wells. But the states will have to deal with a more complex set of interactions.<sup>13</sup>

## Submissions

1.20 The committee advertised the inquiry in the *Australian* and on the committee's website from 26 June 2008. It also wrote to a number of government agencies and organisations alerting them to the inquiry and calling for submissions to be lodged by 15 August 2008 (later extended to 26 August). In total, the committee received 15 submissions. A list of submitters is included in Appendix 1; they are available at: [http://www.aph.gov.au/Senate/committee/economics\\_ctte/offshore\\_petrol\\_08/submissions/sublist.htm](http://www.aph.gov.au/Senate/committee/economics_ctte/offshore_petrol_08/submissions/sublist.htm)

## Public hearings

1.21 The committee held public hearings in Canberra on 29 August and 1 September 2008 and received evidence from many of those who had made submissions to the inquiry.

## Acknowledgement

1.22 The committee thanks those who made submissions to the inquiry and those who provided evidence during public hearings in Canberra. The committee is particularly grateful to the Department of Resources, Energy and Tourism and Geoscience Australia for providing a technical briefing to committee members and for the promptness with which they responded to questions placed on notice at the public hearing.

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13 Ms Margaret Sewell, Department of Resources, Energy and Tourism, *Proof Committee Hansard*, 29 August 2008, p. 12.



# Chapter 2

## Science and economics of offshore CO<sub>2</sub> storage

2.1 Geological sequestration (geosequestration), or carbon capture and storage (CCS), involves capturing the carbon dioxide (CO<sub>2</sub>) that would otherwise be emitted into the atmosphere, compressing it, transporting it to a suitable site, and injecting it into deep geological formations, where it will be trapped for thousands or millions of years.<sup>1</sup>

2.2 Typically, carbon capture and storage has three stages:

- *capturing* CO<sub>2</sub> from fuel and industrial processing and electricity generation plants and compressing into a fluid or supercritical state;
- *transporting* the CO<sub>2</sub> by pipeline or tanker; and,
- *injecting* the CO<sub>2</sub> into a suitable geological formation for long-term isolation from the atmosphere.

2.3 CO<sub>2</sub> can be stored underground in geological formations (onshore and under seabeds) such as deep saline aquifers, depleted oil and gas reservoirs or unminable coal seams. 85 per cent of the world's storage potential is said to be in deep saline aquifers.<sup>2</sup> However, in Australia, oil and gas basins are also considered to have substantial potential for geological storage.

2.4 For most applications, the CO<sub>2</sub> has to be captured and separated, then transported from its source to a compression plant in preparation for injection and storage. The CO<sub>2</sub> is then injected as a dense, liquid-like, supercritical fluid into reservoirs. The CO<sub>2</sub> sits in the microscopic spaces between grains in the sandstone and is trapped by the impermeable rock, or mudstone, which acts as a seal or 'lid'. Generally, the storage needs to be at least one kilometre below the surface so that the pressure, and temperature, is sufficient to maintain the CO<sub>2</sub> as a supercritical fluid.

2.5 Woodside Energy explained to the committee its CCS process differed for liquid natural gas (LNG). The LNG is taken from offshore gas fields and brought onshore by pipeline; the CO<sub>2</sub> is then separated, before being prepared for injection back offshore, several kilometres below sea level:

Before we can make the LNG, we have to remove (the) CO<sub>2</sub> from the gas stream. When we make LNG, we largely take methane and cool it down to about minus 160 degrees Celsius. In cooling the methane down, the CO<sub>2</sub> will freeze before getting to that level, so we have to take it out of the system before we freeze the methane or it plugs up the system. We do that

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1 It may also be referred to as 'clean-coal technology'.

2 Monash Energy, *Submission 3*, fact sheet.

using what are called acid gas removal units. What happens when we remove this gas is that we are left with a relatively pure stream of reservoir related CO<sub>2</sub> potentially available for geosequestration.<sup>3</sup>

## **Viability of CCS technology**

2.6 While the concept of geosequestration of CO<sub>2</sub>, as a means of reducing greenhouse gas emissions, has arisen in the past decade, geosequestration utilises technologies that have been widely practiced in different industries for many years.

2.7 The committee heard evidence suggesting that every element of the technology required for CCS is already in operation: capture, separation, transportation, injection and storage. While the large-scale integrated performance of these components in CCS application is yet to be fully demonstrated, a number of local companies have technological experience with each of the component technologies.<sup>4</sup>

2.8 Dr Geoffrey Ingram, Schlumberger Carbon Services, offered the following assessment of where he believed the industry was at:

...technologically we believe carbon capture and storage is ready to go. What the industry is waiting on is for the legislation and economic drivers to materialise. We believe the federal government's commitment to a price on carbon in the amended legislation going through Parliament House at the moment is the start of this process.<sup>5</sup>

2.9 Internationally, the Sleipner Project is the longest running commercial application of carbon dioxide storage in the world.<sup>6</sup> It has been operating since 1996 when CO<sub>2</sub> separated from natural gas produced from the Sleipner West gas field has been injected into a large, deep saline formation some 800 metres below the bed of the North Sea in Norway. The project is expected to store a total of 20 million tonnes of CO<sub>2</sub> over its lifetime. ExxonMobil explained to the committee that through the project, over 1 million metric tonnes of CO<sub>2</sub> have been stored each year since 1998.<sup>7</sup> There has been no escape of CO<sub>2</sub> in that time.

2.10 The Norwegian government has not created separate legislation for CCS projects and the Sleipner project operates purely under Norway's existing petroleum law. While there are no requirements within this legislation relating to monitoring, remediation or site closure provisions, the Norwegian government considers that

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3 Mr Francis Cumming, Woodside Energy, *Proof Committee Hansard*, 1 September 2008, p. 3.

4 See, for example, Mr Mark Nolan, ExxonMobil, *Proof Committee Hansard*, 29 August 2008, p. 27 and Mr Paul Toni, World Wildlife Fund, *Proof Committee Hansard*, 29 August 2008, p. 19.

5 Dr Geoffrey Ingram, *Proof Committee Hansard*, 29 August 2008, p. 40.

6 This is being undertaken by Statoil, the Norwegian state owned oil company.

7 Mr Robert Young, ExxonMobil, *Proof Committee Hansard*, 29 August 2008, p. 27.

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regulation is now required in regard to safety issues, risk analysis and long term monitoring.<sup>8</sup>

2.11 The committee received submissions from a number of companies currently involved in the development of CCS technologies in Australia. These submissions suggested that while CCS technology is well advanced, it is at an early stage of commercialisation.

2.12 ExxonMobil Australia, with partner Chevron, is currently involved in the largest commercial scale CCS project in Australia. Located off the northwest coast of Western Australia, the Gorgon Project involves a CCS project on Barrow Island. The Greater Gorgon gas fields contain resources of about 40 trillion cubic feet of gas, Australia's largest-known gas resource. The project includes research into greenhouse gas management via injection of CO<sub>2</sub> into deep formations beneath Barrow Island. ExxonMobil describes it as 'the biggest single investment contemplated solely for the management of greenhouse gas emissions'. The Gorgon Project has the potential to be the first project in Australia to reduce significantly greenhouse gas emissions by the injection of carbon dioxide underground.<sup>9</sup>

2.13 Monash Energy, a joint development of Anglo American and Shell Gas and Power, is involved in developing CCS in the Latrobe Valley (Gippsland), through a 'coal-to-liquid' project and through investigating the storage potential of the Offshore Gippsland Basin.<sup>10</sup>

2.14 Schlumberger Carbon Services, who has been involved in providing services for subsurface characterisation and monitoring since the mid 1990s, is currently involved in the large scale CCS demonstration Callide Oxyfuel Project in Queensland and has contributed to a pilot project in the Otway Basin.<sup>11</sup>

2.15 For a full list of Australian carbon capture projects with storage, and with potential storage, see tables at the end of this chapter.

2.16 In its submission to the committee, the Victorian government argued that Victoria also has world-class greenhouse gas storage facilities in the Latrobe Valley/Gippsland Basin, 160 km west of Melbourne:

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8 Department of Resources, Energy and Tourism, answer to questions on notice 1, 29 August 2008.

9 Exxon Mobil Corporation is the largest publicly traded oil and gas company in the world and is the parent company of ExxonMobil Australia. The Exxon Mobil Corporation has a 32 per cent working interest in the abovementioned Sleipner Project. In Australia, ExxonMobil is also involved in CCS projects in the Bass Strait fields. See *Submission 1*, pp. 2–4; Mr Robert Young, ExxonMobil, *Proof Committee Hansard*, 29 August 2008, p. 27.

10 Monash Energy, *Submission 3*, p. 1.

11 Schlumberger is also involved in the Illinois Project (USA) as part of the Midwest Geological Sequestration Consortium; see *Submission 5*, p. 2.

The offshore Gippsland Basin in Commonwealth waters is estimated to have the state's largest potential greenhouse gas storage capacity: roughly 35,000 million tonnes or approximately 285 years of Victorian emissions at current emission rates. The Gippsland Basin is also estimated to be the lowest cost storage site, as it is geographically proximate to Victoria's main emissions source, the coal-powered electricity sector in Gippsland's Latrobe Valley.<sup>12</sup>

2.17 Victoria is also home to the CO2CRC (Cooperative Research Centre for Greenhouse Gas Technologies) project in the Otway Basin. CO2CRC is Australia's premier collaborative research organisation focusing on the development and application of technologies for the mitigation of greenhouse gases.<sup>13</sup> The CO2CRC Otway Project is the world's most advanced demonstration project based solely on storage without associated CO<sub>2</sub> production. The project 'aims to demonstrate that up to 100 000 tonnes of CO<sub>2</sub>, extracted from a nearby natural accumulation, can be safely transported via pipeline and injected and stored while trialling a significant number of potential monitoring and verification techniques'.<sup>14</sup> CO2CRC has also assessed the storage potential of a number of sedimentary basins including the offshore Gippsland, Otway Perth, Browse and Canarvon basins and a number of offshore basins in Victoria, Western Australia, New South Wales and Queensland.<sup>15</sup>

2.18 CCS technology is likely to be of particular relevance to Victoria because the state is heavily dependent upon brown coal for electricity generation. As the above quotation suggests, Victoria has the benefit of having its large emitters located near a geologically suitable storage site. This is frequently not the case and, in its evidence to the committee, Greenpeace suggested that there was no identified suitable site within 500 kilometres of coal-fired power stations in the Newcastle, Sydney and Wollongong area of New South Wales, nor at Port Augusta in South Australia. These regions alone produce 39 per cent of Australia's current net CO<sub>2</sub> emissions.<sup>16</sup>

### **Possible environmental risks associated with CCS**

2.19 While Greenpeace proposed that CCS is a dangerous gamble and therefore 'that the legislation in fact should not proceed and that the proposed activity of burying carbon dioxide underground, either offshore or onshore, should be curtailed',

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12 Mr Dale Seymour, Department of Primary Industries, Victorian Government, *Proof Committee Hansard*, 29 August 2008, p. 20.

13 CO2CRC is a joint venture comprising participants from Australian and global industry, universities and other research bodies from Australia and New Zealand, and Australian Commonwealth, State and international government agencies.

14 Department of Resources, Energy and Tourism, answer to questions on notice 9, 29 August 2008.

15 Cooperative Research Centre for Greenhouse Gas Technologies, *Submission 15*, p. 2.

16 Greenpeace Australia, *Proof Committee Hansard*, 29 August 2008, p. 3.



the committee heard little evidence from other environmental groups suggesting that there were serious environmental risks associated with CCS.<sup>17</sup>

2.20 With respect to the environmental risks of CCS, the House of Representatives Standing Committee on Science and Innovation concluded last year that:

...the desire to employ CCS in combating climate change must not overshadow the need to ensure that environmental risks are avoided...demonstration projects will provide an ideal opportunity to subject CCS to rigorous environmental, health and safety regulations before any future long-term commercial operations are put in place.<sup>18</sup>

2.21 While the report suggests that the benefits of CCS need to outweigh the potential environmental risks, the 'potential benefits need also to be measured against the level of risk to the environment through CCS, compared to the risks if CCS is not used'.<sup>19</sup>

2.22 The Cooperative Research Centre for Greenhouse Gas Technologies similarly argued that the 'low risk of leakage from a storage site should be compared to the fact that 100% of all CO<sub>2</sub> emitted at the present day enters the atmosphere!'.<sup>20</sup>

2.23 The greatest environmental risk associated with CCS appears to relate to the long term storage of captured CO<sub>2</sub>. However, at this point in time, the long term consequences of subterranean and submarine storage of CO<sub>2</sub> are not known, and are unlikely to be known until the process has been tested in actual operation, over a considerable period of time.

2.24 Some submitters to the inquiry suggested that an independent committee of experts be established to advise the minister on a range of issues including environmental protection. This is given further consideration in Chapter 3 which considers provisions for regulating the market.

### **Provisions contained within the bill for the long-term monitoring**

2.25 Section 249CZGAA sets out conditions relating to arrangements for long-term monitoring which are required before a closing certificate can be issued. These arrangements include the programme of long-term monitoring and other operations proposed to be carried out by the Commonwealth following closure and an estimate of the costs.

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17 Greenpeace Australia, *Submission 10*, p. 2. The World Wildlife Fund, while making some caveats, called for 'accelerated approval of demonstration projects'; *Submission 4*, p. 2.

18 House of Representatives Standing Committee on Science and Innovation, *Between a Rock and a Hard Place: the Science of Geosequestration*, August 2007, p. 68.

19 House of Representatives Standing Committee on Science and Innovation, *Between a Rock and a Hard Place: the Science of Geosequestration*, August 2007, p. 56.

20 Cooperative Research Centre for Greenhouse Gas Technologies, *Submission 15*, p. 4.

2.26 Prior to the issuing of a closure certificate, the security commensurate with the finalised program of monitoring activities must be paid to the Commonwealth. Once the closure certificate is issued it is intended that the Commonwealth takes over the agreed work programme of monitoring and other activities, funded through the lodged security.<sup>21</sup>

### ***Environment Protection and Biodiversity Conservation Act***

2.27 The World Wildlife Fund suggested that the proposed bill be amended to provide an environmental impact assessment to be undertaken prior to the issuing of any approval for exploration, injection and storage operations. Further, it suggested that the bill be amended to include 'no-go zones' around sensitive natural and heritage areas and provide large environmental buffers around protected or vulnerable marine and offshore areas.

2.28 However, evidence from the Department of Resources, Energy and Tourism suggested that the *Environment Protection and Biodiversity Conservation Act* provides a legal framework to protect and manage important flora, fauna, ecological communities and heritage places—defined in the Act as matters of national environmental significance. The Act provides that any activity needs to be referred under the Act if the proponent is of the view that the activity will significantly affect any matter of national environmental significance. This includes Commonwealth marine areas and would apply to CCS projects.<sup>22</sup>

### **Amounts of energy used for CCS**

2.29 Evidence was received suggesting that CCS technology uses large amounts of energy and that the wide scale adoption of CCS would increase resource consumption by 30 per cent. The World Wildlife Fund claimed:

It is believed that CCS operating in that whole system will reduce the efficiency of power stations by about 30 per cent. But that takes them down to about the level of efficiency of a nuclear power station, without the hundreds of thousands of years of toxic waste. Coal is cheap. This technology may in fact not be as expensive as people are saying, but we will not know until we find out, and that is the stage that we would argue should be accelerated<sup>23</sup>

2.30 Evidence from Greenpeace claimed the technology itself uses between 10 and 40 per cent of the energy produced by a power station, and further that, 'wide scale

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21 Department of Resources, Energy and Tourism, answer to questions on notice 3, 29 August 2008.

22 Department of Resources, Energy and Tourism, answer to questions on notice 2, 29 August 2008.

23 Mr Paul Toni, World Wildlife Fund, *Proof Committee Hansard*, 29 August 2008, p. 19.

adoption of CCS is expected to erase the efficiency gains of the last 50 years and increase resource consumption by one-third'.<sup>24</sup>

### **CCS versus alternatives**

2.31 The committee received several submissions in which it was claimed that CCS storage is a 'distraction from undertaking real action on reducing greenhouse gas emissions' or that CCS is an 'end of pipe' response that attempts to manage the effects of a system reliant on fossil fuel consumption.<sup>25</sup> That is, that CCS allows for nations to continue their reliance upon fossil fuels.

2.32 This notion of CCS being a distraction from undertaking real action on climate change raises the question of opportunity cost. Environmental groups suggest that, 'Money spent on CCS will divert investments from sustainable solutions to climate change'.<sup>26</sup> In turn, they argue that if the substantial investment in CCS projects was diverted to renewables then Australia could achieve its necessary emission reductions without developing CCS.<sup>27</sup>

2.33 This would involve Australia shifting its energy base away from coal and oil to a diverse portfolio of renewable energy technologies.

### **The economics of carbon capture and storage**

2.34 Under an emissions trading scheme, or a carbon tax, polluters must pay for the damage done to the environment by their activities. A company will therefore be willing to pay for CCS if the cost of storing CO<sub>2</sub> in this way is less than the cost of purchasing a permit to emit CO<sub>2</sub> into the atmosphere.

2.35 The committee heard a wide range of estimates of the carbon price necessary for CCS to be commercially viable, from \$20 to \$100 per tonne. However, the majority view seems to be that a price of around \$40–\$50 would represent a breakeven point:

...[the International Energy Agency's] figures were in the order of US\$45 a tonne to US\$70 to US\$80 a tonne, depending on the technology.<sup>28</sup>

For the offshore injection of CO<sub>2</sub>, which is very expensive in terms of the technology around the special steel pipelines and the injection wells and the special corrosion-resistant alloys required for that, some estimates have

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24 Greenpeace Australia, *Submission 10*, p. 2.

25 Greenpeace Australia, *Submission 10*, p. 2; Australian Network of Environmental Defenders' Offices, *Submission 2*, p. 2.

26 Ms Helen Oakey, Greenpeace Australia, *Proof Committee Hansard*, 29 August 2008, p. 3.

27 Ms Emily Rochon, Greenpeace Australia, *Proof Committee Hansard*, 29 August 2008, p. 4.

28 Mr Dale Seymour, Victorian Department of Primary Industries, *Proof Committee Hansard*, 29 August 2008, p. 25.

been made that a carbon price between \$50 and \$100 will be needed to make that economically viable.<sup>29</sup>

It would be above \$20 a tonne.<sup>30</sup>

...but it has got to be over \$40 or \$50 a tonne to get people to start thinking about this sort of technology, or any of the other technologies. At the moment, the renewables are being given the incentive of the MRETS (Midwest Renewable Energy Tracking System) and a potential extension to that scheme. But if you remove that sort of thing you are looking at a carbon price up at about \$50 or \$60.<sup>31</sup>

2.36 The breakeven price will vary for different kinds of CCS projects. A large proportion of the cost of CCS projects for coal-fired power stations will comprise building and operating the plants to capture and liquify the carbon, and building pipes to transport it to the coast, even before the process of storing it offshore begins. Storage of CO<sub>2</sub> generated by offshore oil drilling will therefore be viable at much lower carbon prices than would CCS of CO<sub>2</sub> generated by coal-fired power stations. It will also be considerably more expensive to retrofit carbon capture facilities to existing power stations than to build it into new power stations.

2.37 Both sides of the debate agreed that CCS would be a costly process:

The technology itself uses between 10 and 40 per cent of the energy produced by a power station...CCS is expensive. It could lead to a doubling of plant costs and an electricity price increase of 21 to 91 per cent.<sup>32</sup>

...the storage cost is not the big part...The big cost is at the power station, building a massive plant on the front end for oxyfuel or on the back end for post-combustion capture...and also the enormous amount of energy you need to drive that. You are looking at between 20 and 30 per cent of the power station's output to drive the capture. It is costly.<sup>33</sup>

2.38 However, the Cooperative Research Centre for Greenhouse Gas Technologies claimed that while the cost of deploying the technology is likely to be high:

...the economies of scale that could be achieved through deployment will probably make the technology cheaper than some renewable energy generation resources currently being deployed.<sup>34</sup>

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29 Mr Mark Nolan, ExxonMobil, *Proof Committee Hansard*, 29 August 2008, p. 32.

30 Dr Geoffrey Ingram, Schlumberger Carbon Services, *Proof Committee Hansard*, 29 August 2008, p. 41. Dr Ingram cited the IPCC as saying around \$10 for the storage component alone.

31 Mr Ralph Hillman, Australian Coal Association, *Proof Committee Hansard*, 29 August 2008, p. 51.

32 Ms Helen Oakey, Greenpeace Australia, *Proof Committee Hansard*, 29 August 2008, pp. 2–3.

33 Mr Ralph Hillman, Australian Coal Association, *Proof Committee Hansard*, 29 August 2008, p. 50.

34 Cooperative Research Centre for Greenhouse Gas Technologies, *Submission 15*, p. 1.

2.39 A high (expected) carbon price does not necessarily mean the widespread adoption of CCS. A high price will reduce the overall demand for energy and encourage greater efficiency. It will also make renewable energy producers, which do not need to purchase permits or pay for CCS, more competitive in selling energy.

2.40 Commercial CCS projects will operate on a very large scale and cost hundreds of millions if not billions of dollars. Only very large companies, or consortia, will be in a position to undertake them, and they will need to be confident before starting them. Having clear rules in place, and preferably with bipartisan support, will be important in creating an investment climate conducive to undertaking CCS projects.

2.41 The Victorian Government wants a competitive market:

...greenhouse gas storage formations are a new resource and should be treated as separate and distinct from petroleum resources, which are commonly co-located. An equitable and competitive market for access to CCS resources is therefore essential. The rights of CCS proponents should not be treated as subordinate to those of existing petroleum titleholders or of the petroleum industry generally...Areas should not be excluded solely because there are existing petroleum titles over them.<sup>35</sup>

2.42 A challenge for CCS is what one witness termed 'reputational risk':

These projects are so reliant on public confidence that they really have to be done properly...It would only take one CCS project going wrong, leaking or having someone cut corners somewhere for CCS to be off the public agenda and going the same way as genetically modified crops. The science may be good but, if public confidence turns against it, we will lose out.<sup>36</sup>

### **Current public expenditure on CCS projects**

2.43 Under the Low Emissions Technology Demonstration Fund (LETDF), a total of \$410 million has been offered to applicants involved in developing low emissions technologies.<sup>37</sup>

2.44 CSS projects currently receiving funding under this scheme include:

- *Chervon Gorgon carbon dioxide (CO<sub>2</sub>) Injection Project*—the project is part of the Gorgon development off the northwest coast of Western Australia. It includes the injection of carbon dioxide into the Dupuy Formation saline

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35 Mr Dale Seymour, Victorian Department of Primary Industries, *Proof Committee Hansard*, 29 August 2008, pp. 20–1.

36 Dr Geoffrey Ingram, Schlumberger Carbon Services, *Proof Committee Hansard*, 29 August 2008, p. 43.

37 For a complete list of funded projects under LETDF Round 1 see: [http://www.ret.gov.au/energy/Documents/2008%2007%2029%20LETDF\\_Round\\_1\\_Funded\\_projects.pdf](http://www.ret.gov.au/energy/Documents/2008%2007%2029%20LETDF_Round_1_Funded_projects.pdf) (accessed: 4 September 2008).

aquifer underneath Barrow Island. Total cost of the project: \$841 million; Australian government contribution: \$60 million.

- *CS Energy: Oxy-firing demonstration and carbon sequestration project*—the project will be implemented using the Callide A power station at Biloela in central Queensland. The total cost of project: \$188 million; Australian government contribution: \$50 million.
- *HRL Limited: Clean Coal Demonstration Project*—the project demonstration will be implemented at the Loy Yang Bench in the Latrobe Valley, Victoria. The total cost of the project: \$750 million; Australian government contribution: \$100 million; Victorian government contribution: \$50 million.
- *International Power: Hazelwood 2030*—the demonstration project will occur at the Hazelwood power station in the Latrobe Valley, Victoria. Total project cost: \$369 million; Australian government contribution: \$50 million; Victorian government: \$30 million.

### Australian Capture Projects with Storage

Name, state	Lead	Description	CO <sub>2</sub> Source	Injection Rate	Start-up
Otway Project VIC	CO2CRC	Storage demonstration project	Natural Gas / CO <sub>2</sub> well	100 kt total	April 2008
Moomba CO <sub>2</sub> Storage Project SA	Santos	Regional CO <sub>2</sub> Storage Hub. Initial demonstration through EOR	Natural Gas	1mt total	2010
Gorgon LNG Project WA	Chevron	15mtpa Gas field development with CO <sub>2</sub> Capture and Storage	Natural Gas	Up to 4mtpa	2012–2013
Callide Oxyfuel Project QLD	CS Energy Ltd	30MW Coal fired boiler Oxyfuel retrofitting Capture and CO <sub>2</sub> Storage	Black coal	Up to 50 kt	2010–2011
ZeroGen Project QLD	Stanwell Corp.	100MW IGCC and CO <sub>2</sub> Capture and Storage	Black Coal	Up to 400 ktpa	2011–2012
Monash CTL Project VIC	Monash Energy	Coal to liquids CO <sub>2</sub> Capture and Storage	Brown Coal	Up to 15 mtpa over 40 years	2015
Fairview Project QLD	GE Santos	100MW CSM post combustion capture and CO <sub>2</sub> re-injection	Enhanced CSM	100 ktpa	TBD
Browse Project	Woodside	18tcf Gas field development with possible CO <sub>2</sub> Capture and Storage	Natural Gas	ytbd	2013–2015

### Australian Capture Projects with Potential Storage

Name	Lead	Description	CO <sub>2</sub> Source	Injection Rate	Start-up
HRL Project VIC	HRL	400MW IDHCC Pilot Scale CO <sub>2</sub> Capture	Brown Coal	Future potential storage	Post 2009
Hazelwood 2030 PCC Project VIC	International Power	200MW Boiler re-fit. 10-20ktpa solvent based capture	Brown Coal	Future potential storage	Late 2008
Loy Yang PCC Project VIC	Loy Yang Power	5,000 tpa mobile PCC facility trials	Brown Coal	Future potential storage	2008-2009
Munmorah PCC Project NSW	Delta Electricity	5,000 tpa mobile PCC facility trials		Future potential storage	Mid 2008
FutureGas Project SA	Hybrid Energy	150-300MW Lignite CFB Combustion and Gasification CO <sub>2</sub> Capture and Storage	Brown Coal	ytd	2015
Collimbah Power Project WA	Aviva Corp.	2x200MW Oxyfuel with conversion for CO <sub>2</sub> capture and storage	Black Coal	ytd	2012

Source: Department of Resources, Energy and Tourism



# Chapter 3

## Provisions for regulating the market

### Process of awarding acreage

3.1 It is intended that the process for selection and awarding acreage will be based upon the model utilised for petroleum acreage in Commonwealth offshore waters. The Department of Resources, Energy and Tourism explained:

By notice published in the Gazette, applications will be invited for the grant of a work-bid or cash-bid GHG assessment permit over a block or blocks specified in the notice. The work bidding allocation process invites applicants to submit proposals for specific exploration activities and expenditure to be undertaken. Applications are assessed against publicly available criteria and areas offered to the applicant who best meets the criteria. While the extent and quality of an applicant's bid will form the basis of the selection criteria, other criteria may also be considered to reflect the public interest.<sup>1</sup>

3.2 Section 249CR allows existing petroleum producers to utilise suitable storage formations within their production licence area to store permanently CO<sub>2</sub> that has been produced as a result of petroleum production. They do not have to go through the competitive bid process to obtain the right to use the storage formation.

3.3 The committee received numerous submissions which argued that the proposed legislation gives advantage to existing petroleum title holders over prospective greenhouse gas storage (GGS) title holders. Claiming that petroleum producers who hold pre-existing site and technological knowledge have a natural advantage when it comes to acquiring acreage, a number of submitters suggested that the awarding of acreage should be subject to a more transparent, equitable and competitive process. Alternatively, it was suggested that it should be allocated according to 'public interest'.<sup>2</sup>

3.4 Dr Geoffrey Ingram, Schlumberger Carbon Services, outlined the position of new entrants to the industry:

Our position is that of a new industry, a new entrant into the carbon storage business that does not have any existing acreage over the oil and gas tenements. So, in terms of being able to build, grow and develop our

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1 Department of Resources, Energy and Tourism, answers to questions on notice 7, 29 August 2008.

2 For example, Anglo Coal submitted that the bill gives primacy to the rights of petroleum tenement holders: 'The Bill is heavily biased towards the protection of petroleum interests and, while it nominally makes CCS possible, it does not reflect a determination to make it happen.', Anglo Coal, *Submission 7*, p. 1.

business, we would need access to acreage for the large-scale storage projects. If the existing tenement holders have an option to convert, then essentially the easiest thing to do is to wait until the very last minute before you decide whether you would convert or whether you would relinquish the acreage. If it is set out as Victoria is proposing, with overlapping tenements from the start, then let the existing tenement holders in the oil and gas industry apply for it if they are serious about considering the business, rather than giving them a free kick...<sup>3</sup>

3.5 In its submission, BP Australia suggested that under the proposed legislation there are two types of project which are likely to be developed in the near term, but that the bill facilitates the latter:

...one involves CO<sub>2</sub> from an emission source such as a power station, i.e. with no link to a petroleum project, and the other is CO<sub>2</sub> from an emission source which is an integral part of an associated petroleum operation such as an LNG plant.<sup>4</sup>

3.6 Some submitters went further and argued that existing titleholders, the large oil companies, would have almost a right of veto over the use of some of the high quality potential CCS sites.<sup>5</sup>

3.7 Because of the strategic advantage held by the petroleum industry—and that the technical expertise for injection and storage rests almost entirely within the petroleum industry—new CCS projects may need to form partnerships with petroleum companies.

3.8 This may also result from the fact that GHG storage proponents, who wish to take up and assess areas where future storage activities may have the potential to affect established petroleum activities, may have additional operational considerations and constraints placed upon their activities. For in order for the relevant minister to approve an activity, the GHG title holder would need to pass a 'no significant impact test', demonstrating either:

- that their activities will have no significant adverse impact on these pre-commencement petroleum operations; or
- that an agreement has been reached between the two parties in relation to the activities.

3.9 In its submission, Monash Energy suggested that offshore gas producers may have a vested interest in discouraging CCS in their sites as it would be making coal a more viable competitor with gas:

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3 Dr Geoffrey Ingram, Schlumberger Carbon Services, *Proof Committee Hansard*, 29 August 2008, p. 41.

4 BP Australia, *Submission 6*, p. 6.

5 World Wildlife Fund, *Submission 4*, p. 12, citing the CO2CRC.

The rather hopeful expectations on the part of Government officials which accompanied release of the Bill seem to reflect a view that given an emissions trading scheme (ETS) and a CO<sub>2</sub> price, CO<sub>2</sub> storage could be an attractive business for a petroleum tenement holder. Please keep in mind that the dominant product from such tenements is in fact natural gas, which is held by few parties and competes with coal to provide energy to Australian consumers. As their economic interests are against facilitating CCS for third parties this may push out the timing for introduction of CCS past 2030 (if at all). Blithe expectations for the formation of 'commercial agreements' between incumbents and GHG injection applicants gloss over the reality that the commercial interests of the incumbent will go way beyond 'non-interference' with petroleum extraction.<sup>6</sup>

3.10 By contrast, the committee also received representations seeking to protect further the rights of current petroleum licence holders. In its submission, Woodside Energy suggested that 'enforcing a bid process onto projects of this type creates a new and unnecessary risk to cost and schedule not faced by our international competitors'.<sup>7</sup>

3.11 Such a view was supported by ExxonMobil who suggested 'issuing overlapping access leases or licenses should be carefully considered as simultaneous CCS operations and oil and gas production can create potentially significant safety and operational risk'.<sup>8</sup>

3.12 Upon commencement of the legislation all future titles grants for petroleum and GHG activities will be given an equal level of protection, where there is the potential for adverse impacts. If the two activities cannot occur at the same time the relevant Minister may make a decision based upon public interest as to whether the petroleum or GHG activity should proceed.

3.13 Woodside also suggest that integrated petroleum developments 'be able to sequester greenhouse gases arising from that development without being required to bid for the right to undertake that activity'.<sup>9</sup> This seems to be a logical step for offshore petroleum operations, and it seems unlikely that any decision would jeopardise this form of integrated operation. However, it may be useful for this to be clarified.

3.14 Schlumberger raised concerns about the regulatory framework for managing the interaction between GHG injection and storage operators and those with pre-existing or co-existing rights, particularly as this related to an 'information asymmetry':

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6 Monash Energy, *Submission 3*, p. 2.

7 Woodside Energy, *Submission 9*, p. 2; Mr Niegel Grazia, Woodside Energy, *Proof Committee Hansard*, 29 August 2008, p. 3.

8 ExxonMobil, *Submission 1*, p. 12.

9 Mr Niegel Grazia, Woodside Energy, *Proof Committee Hansard*, 29 August 2008, p. 2.

...the information asymmetry that currently exists between existing oil and gas producers and any new storage project proponent makes it difficult to envisage how a storage project could get up without extremely deep pockets and a huge appetite for risk. The Bill recognizes that existing property rights must be protected and that any overlapping projects must have a commercial agreement between the respective promoters. If the onus is on the storage proponent to show no adverse impact on existing oil and gas operations then they must have access to data held by the oil and gas operator to prove this. The Government should be able to set and enforce a strict timeline on when an agreement must be reached by two parties otherwise it will apply the 'public interest' clause. We envisage most of the potential conflicts to come from overlapping storage and hydrocarbon operations as opposed to storage and fishing operators. One suggestion might be for all exploration and production data to be placed on open file within 1 or 2 years of acquisition.<sup>10</sup>

3.15 Acknowledging that the legislation offers no incentive for petroleum title holders to make their data available, the Cooperative Research Centre for Greenhouse Gas Technologies commented, 'access to data could represent a significant hurdle to the development of offshore storage'.<sup>11</sup>

### **Proposed administrative model—ministerial discretion**

3.16 Many submitters to the inquiry considered that the proposed legislation allows excessive ministerial discretion.

3.17 Under the proposed legislative model, the Australian government and ultimately the relevant minister will be responsible for administering the regulation of GHG transport injection and storage in Commonwealth offshore waters. The proposed legislation confers upon the minister a number of discretionary decision-making powers in an effort to balance competing activities and associated needs.

3.18 The discretionary ministerial powers contained within the legislation deal with specific situations such as public interest assessments, the analysis of significant impacts or to give directions in a 'serious situation', and as such are very narrow in their application. Given the objective-based nature of the legislation and recognising the lack of decision-making precedents, the ability to make decisions on a case by case basis for these specific issues was considered to offer the most efficient option.

3.19 The committee notes that a number of submitters call for more explicit definition of terms to which the minister is to have regard in exercising discretion, these included: 'public interest', 'significant impact criteria', 'significant risk', and 'no

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10 Schlumberger Carbon Services, *Submission 5*, p. 4.

11 Cooperative Research Centre for Greenhouse Gas Technologies, *Submission 15*, p. 4.

significant adverse impact'.<sup>12</sup> These terms may need to be further defined in order to provide clear guidance.

3.20 Some submitters questioned whether the discretionary powers held by the minister will provide sufficient regulatory protection, while others suggested an alternative administrative model, such as a committee or advisory panel.

### **Designated authority—committee or panel of experts**

3.21 In Chapter 2 it was suggested that a panel of experts could be established to make recommendations to the minister on a variety of matters relevant to administration and regulation of the legislation. Members of such a committee might include representatives from Geoscience Australia, accredited scientific experts, representatives from the states and territories, technological and policy experts and members of the community.

3.22 A committee, or panel of experts, might have designated authority and could be involved in a range of activities including:

- assessing any environmental impact statements prior to approving any CCS operation;
- site selection;
- providing advice on monitoring and regulation of licence holders;
- resolving disputes between petroleum licence holders and GHG proponents; and
- approving site closure certificates.

3.23 The Victorian suggested the following model:

...the responsible Commonwealth minister should be assisted by an expert panel, including representatives from the states and territories. The expert panel should be able to advise the minister and make recommendations. The expert panel should be able to hold hearings to take formal submissions from government, industry and community groups. The recommendations of the expert panel should be made publicly available. An assessment of competing resource impacts should be required for any resource operations proposed under the legislation. This assessment process should include considerations of impacts, both positive and negative, on other resources and entitlements including, in the Victorian context, onshore groundwater resources.<sup>13</sup>

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12 For example, ExxonMobil, *Submission 1*, p. 3; Monash Energy, *Submission 3*, pp. 3–5.

13 Victorian government, *Proof Committee Hansard*, 29 August 2008, p. 21.

3.24 Some form of expert panel was also supported by the World Wildlife Fund and the Australian Network of Environmental Defenders' Offices.<sup>14</sup>

3.25 Depending on the preferred degree and nature of transparency and accountability, there are a number of ways such a panel could be structured:

- Giving advice in private to a minister, which could be accepted or rejected at the minister's discretion;
- Giving advice publicly to a minister, which may involve some political cost if rejected; or even
- Delegating to the panel the power to make decisions, with the minister needing parliamentary approval to override the panel's decision.

### **Lease timeframes**

3.26 The duration of the GHG permit and licences will be significant to the success of the CCS industry. They must be sufficiently long to facilitate GHG operations, but not be so long as to delay the development of a new industry.

3.27 In the proposed legislation, the duration of a GHG assessment permit is 6 years. It cannot be renewed. A holding lease lasts for 5 years and can be renewed once. A GHG injection licence has no fixed term but is subject to certain conditions. For example, if no injection has occurred during the first 5 years of issue the licence can be revoked.

3.28 In its submission, BP Australia argued that an injection license has a 5 year duration but there may be very valid technical reasons why a legitimate proponent cannot commence injection activity within 5 years, particularly if they are planning to inject into a hydrocarbon reservoir which must be depleted first.<sup>15</sup>

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14 See, for example, World Wildlife Fund, *Proof Committee Hansard*, 29 August 2008, p. 15; Victorian government, *Proof Committee Hansard*, 29 August 2008, p. 21; Australian Network of Environmental Defenders' Offices, *Proof Committee Hansard*, 29 August 2008, p. 44; Australian Network of Environmental Defenders' Offices, *Submission 2*, p. 3.

15 BP Australia, *Submission 6*, p. 6.

# Chapter Four

## Provisions for liability

4.1 In requesting the bills be referred to the Economics Committee, the Selection of Bills Committee specifically referred to a particular concern that the bills shift liability for leakage of CO<sub>2</sub> from geological storage from the large greenhouse gas emitters to the public.

4.2 The Scrutiny of Bills Committee has also drawn attention to the provisions that create offences of strict liability.<sup>1</sup>

4.3 The proposed legislation, like the arrangements relating to petroleum, is silent on the question of long-term liability. Once the licensee's statutory obligations cease when the closing certificate is issued, future issues of liability would be in the domain of the common law.

4.4 As the Department of Resources, Energy and Tourism put it:

The bill does not ascribe liability. This is left to common law. Following the existing offshore petroleum model, the proposed amendments will neither extinguish nor limit the common-law liability, including long-term liability, of participants in greenhouse gas projects. Under the contents of the bill as currently drafted, the Commonwealth will therefore not take over long-term liability from nor provide any indemnity to project participants in respect of any liability they may incur.<sup>2</sup>

4.5 The Department argued it would be undesirable to include an explicit provision for the government to assume long-term liability from the project participants or provide indemnity to project participants in respect of any liability they might incur. The Department explained:

...basically, the assumption of liability by the Commonwealth would be quite contrary to site closure processes as required under activities otherwise regulated by the Commonwealth. The emphasis in the bill and in the approach taken to allocating sites for storage has been to minimise the liability risk all the way through.<sup>3</sup>

4.6 An alternative view, mostly expressed by industry representatives, was that the government needs to accept long-term liability:

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1 Strict liability is a legal doctrine that makes a person responsible for the damage and loss caused by his/her acts and omissions regardless of culpability (or fault in criminal law terms).

2 Ms Margaret Sewell, Department of Resources, Energy and Tourism, *Proof Committee Hansard*, 29 August 2008, p. 9.

3 Ms Margaret Sewell, Department of Resources, Energy and Tourism, *Proof Committee Hansard*, 29 August 2008, p. 9.

...we would expect that that injector of carbon dioxide would be required to meet certain standards in the injection process and then also certain standards in what we would term the closure process. It is our view that once those standards have been met they should be relieved from the long-term obligation on liability. It would be unreasonable for those companies to retain that liability long term, because we are talking about decades, if not centuries...unless the government or a statutory body is willing to take on this obligation, there will not be enough incentive for companies to go in and undertake these sorts of operations. We believe that it is important to provide that clarity to encourage companies to go in and undertake this.<sup>4</sup>

...after a suitable period of assessment and with appropriate monitoring, the liability should return to the state.<sup>5</sup>

...at that point in time that industry, given that it has tenure and can actually do something about it, has demonstrated to the satisfaction of government that all is as well as it can be—'risks are as low as reasonably practicable' is the industry term. We are submitting that at that point liability would transfer to the Commonwealth.<sup>6</sup>

The failure to transfer post closure liability to the Commonwealth is an impost on embryonic greenhouse gas storage activities.<sup>7</sup>

WWF submits that the Bill be amended to...provide that upon the issue of the site closure certificate liability and ownership of the carbon dioxide pass to the Commonwealth...[but that] the GHG injection operator remains liable under common law.<sup>8</sup>

...long-term stewardship (and therefore liability) should rest with a long-term entity such as the State.<sup>9</sup>

#### 4.7 Monash Energy and BP Australia argued the government should assume responsibility so as to encourage offshore CCS:

The viability of greenhouse gas injection and storage is at an embryonic stage. The placement of longer term liability with the Commonwealth should be considered in the context of the public's interest in the mitigation of greenhouse gas through offshore storage.<sup>10</sup>

As the Bill is drafted, it asks the GHGS proponent to accept a liability that is quantified neither in time, scale or scope. The proponent will weigh this against the alternative liability associated with releasing CO<sub>2</sub> to atmosphere

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4 Mr Mark Nolan, ExxonMobil, *Proof Committee Hansard*, 29 August 2008, pp. 29–30.

5 Mr Roger Bounds, Monash Energy, *Proof Committee Hansard*, 29 August 2008, p. 36.

6 Mr Simon Daddo, Woodside Energy, *Proof Committee Hansard*, 1 September 2008, p. 8.

7 Monash Energy, *Submission 3*, p. 5.

8 World Wildlife Fund, *Submission 4*, p. 3.

9 BP Australia, *Submission 6*, p. 1.

10 Monash Energy, *Submission 3*, p. 28.



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and paying the cost of carbon, a liability which can be immediately quantified and discharged.<sup>11</sup>

4.8 Some submissions made a distinction between demonstration projects and later commercial projects. Two joint submissions argued that the government should indemnify demonstration projects against long-term common law liability.<sup>12</sup>

4.9 The industry position received some support in the recently published report from the House of Representatives Standing Committee on Primary Industries and Resources, which recommended:

...that a process for the formal transfer of long term liability from a GHG operator to the Government be established within the proposed legislation, such transfer to be conditional upon strict adherence to prescribed site closure criteria.<sup>13</sup>

4.10 Some submissions were doubtful about this argument:

It will take time to establish whether this complexity and ongoing liability will be a disincentive to investment in the scheme and compromise the efforts to reduce GHG emissions.<sup>14</sup>

4.11 Others clearly rejected the idea of the government assuming the long-term liability. Greenpeace argued:

This effectively transfers responsibility and liability to the Commonwealth. This is unacceptable, as the agent responsible for storing the CO<sub>2</sub> must be responsible for its long-term monitoring and liable for any adverse environmental impacts, including failure of the site to effectively store the CO<sub>2</sub>.<sup>15</sup>

4.12 Even some who thought government might eventually assume liability wanted this to be in a distant period:

...given the uncertainty around CO<sub>2</sub> storage and the lack of current demonstration, a fixed time period for monitoring by operators is necessary to ensure environmental integrity and public confidence...there would be a minimum 30-year period during which the company is responsible for

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11 BP Australia, *Submission 6*, p. 1.

12 Australian Coal Association and Minerals Council of Australia, *Submission 12*, p. 7; Australian Coal Institute, Climate Institute, Construction, Forestry, Mining and Energy Union and World Wildlife Fund, *Submission 13*, p. 2. In their submission, the Cooperative Research Centre for Greenhouse Gas Technologies explained that they were able to obtain insurance cover for the construction and operational phase of their project but were not able to obtain cover beyond 10 years after closure. *Submission 15*, p. 4.

13 Recommendation 14 House of Representatives Standing Committee on Primary Industry and Resources, *Down Under: Greenhouse Gas Storage*, August 2008, pp. 74–9.

14 Western Australian Department of Industry and Resources, *Submission 8*, p. 6.

15 Greenpeace Australia, *Submission 10*, p. 4.

monitoring and verification and also holds the liability...common law liability still remains in place so that, if there is any negligence, companies could still be sued.<sup>16</sup>

4.13 One senator noted the incongruity of companies being unwilling to bear a liability they were assuring the community was negligible:

If you are confident that it is not going to leak...why would you not take liability for it and why would you want to shift that to the community?<sup>17</sup>

4.14 Whichever way the argument is resolved there were calls for more clarity. The Australian Network of Environmental Defenders' Offices (ANEDO) thought the bill should:

...more clearly define the long term liability of operators and the Commonwealth;<sup>18</sup>

4.15 This call was prompted by their concern that:

Whilst the issuing of a SCC may provide industry with the confidence to invest in CCS, it simultaneously increases the potential of public liability. Once a SCC is granted, the recipient is no longer responsible for the ongoing monitoring, measurement and verification and so provides the operator with a limitation point for further statutory liability and financial responsibility...by providing industry such assurances, the Bill establishes a framework that operates counter to the public interest of ongoing monitoring and site stability to ensure effective long-term GHG storage...[and] may reduce incentives for project operators to design and implement projects in a safe and reliable manner.<sup>19</sup>

4.16 The question of liability is complicated by the fact that potential liabilities for a carbon storage project run for centuries, far longer than the lifespans of most companies or the length of insurance contracts. If the company who had conducted the storage is long gone, implicitly the liability may be seen to rest with the government. This point was conceded by the Department:

...the natural progression of time could well mean that there may be nobody to pursue under common law...the passage of time would

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16 Ms Kellie Caught, World Wildlife Fund, *Proof Committee Hansard*, 29 August 2008, pp. 15–6.

17 Senator Christine Milne, *Proof Committee Hansard*, 1 September 2008, p. 7. In a similar vein, Greenpeace noted 'the industry has viewed liability as a barrier to wider deployment of CCS and has only accepted liability over timescales of years rather than the indefinite period that CO<sub>2</sub> must remain underground to be safe. Perhaps this can be seen as a vote of no-confidence in CCS from the industry itself.'; Ms Helen Oakey, Greenpeace Australia, *Proof Committee Hansard*, 29 August 2008, p. 3.

18 Australian Network of Environmental Defenders' Offices, *Submission 2*, p. 3.

19 Australian Network of Environmental Defenders' Offices, *Submission 2*, p. 3.

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inevitably pass some of that responsibility back to the community in that way, but...It is not a legislated thing.<sup>20</sup>

4.17 One response to this problem is a suggestion that while the storage is taking place the company should contribute to a fund which could be drawn on much later (even after the company no longer exists) in the event that a problem arises. This could be like a 'bond' tenants provide to a landlord, relating to a specific project, in which case the return on the assets provided might be returned to the company. Alternatively, it could take the form of a contribution to a pooled fund covering many projects, something like insurance, from which claims could be made in the event of a leak.

4.18 Two environmental groups submitted:

...the Bill should introduce an industry funded, Commonwealth held trust to ensure funds are available for future remediation works in the event that the party liable are no longer in existence.<sup>21</sup>

...long-term monitoring, measurement and verification operations should be paid for from an industry fund accumulated by either a levy, fee on injection or the sale of carbon credits equal to a (relatively small) percentage of the CO<sub>2</sub> stored in the relevant geological formation.<sup>22</sup>

4.19 This was also supported by the Cooperative Research Centre for Greenhouse Gas Technologies:

There is clearly a public benefit in mitigating the extent to which CO<sub>2</sub> enters the atmosphere and therefore it may be appropriate that the Government shares liability with industry proponents; with industry carrying liability up to the closure/early post closure stage and Government beyond that point, perhaps with a bond and/or specific closure requirements to ensure that there will be no major cost on the public purse.<sup>23</sup>

4.20 This would represent a larger scale version of the provision in the bill (Section 249CZGAA) setting out conditions relating to arrangements for long-term monitoring which are required before a closing certificate can be issued. These arrangements include a requirement for the company to lodge a security that covers the estimated cost of long-term monitoring and other operations proposed to be carried out by the government. A similar provision is required in legislation proposed by the Victorian government which:

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20 Ms Margaret Sewell, Department of Resources, Energy and Tourism, *Proof Committee Hansard*, 29 August 2008, p. 10.

21 Australian Network of Environmental Defenders' Offices, *Submission 2*, p. 8.

22 World Wildlife Fund, *Submission 4*, p. 9.

23 Cooperative Research Centre for Greenhouse Gas Technologies, *Submission 15*, p. 4.

...requires CCS operators pay to the state the estimated cost of long-term monitoring and verification prior to the surrender of an injection title.<sup>24</sup>

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24 Ms Anna Beesley, Victorian Department of Primary Industries, *Proof Committee Hansard*, 29 August 2008, p. 23.

# Chapter Five

## Conclusions and recommendations

5.1 It is widely accepted that measures need to be taken to reduce the impact of energy supply on the concentration of CO<sub>2</sub> in the atmosphere. Carbon capture and storage (CCS) can provide a means of reducing atmospheric CO<sub>2</sub>. The Gorgon Project in northwest Australia is one example of a project that plans to reduce greenhouse gas emissions through storing CO<sub>2</sub> underground, on Barrow Island.

5.2 A clearly set out and competitive framework for CCS will potentially lower the cost of addressing the climate change challenge. Ultimately, this should translate into a smaller increase in household electricity bills to achieve the goal of limiting climate change.

5.3 There were those who questioned the safety of CCS technology, including both Greenpeace and the Australian Network of Environmental Defenders' Offices. There was no evidence from the Department of Resources, Energy and Tourism or Geoscience Australia to suggest that the technology was inherently unsafe. However the committee notes that it is appropriate that the onus of proof should lie with proponents to demonstrate that the technology is safe.

5.4 More questionable than the technological feasibility of CCS was whether it would be commercially viable on a large scale within Australia. In particular, the committee was concerned about the location of geologically suitable storage sites as many existing power stations are a long way from sites of capture, as is the case with the Hunter Valley.

5.5 Doubts remained as to whether CCS would be capable of sequestering enough CO<sub>2</sub>, or be commercially operational in time, to mitigate climate change in the optimal time. These doubts reinforced the committee's view that CCS should not be considered the only answer to reducing CO<sub>2</sub> emissions, but rather that it be developed along with other technologies capable of reducing the impact of climate change.

5.6 It is important to get the legislation and regulations in place expeditiously to assist in providing certainty for possible investors.

5.7 As noted in Chapter 1, the commercial operation of CCS will require complementary legislation by the states. So far they have made varying degrees of progress on this. The committee hopes the federal and state departments, possibly under the aegis of COAG, will make quick progress on introducing nationally consistent legislation.

5.8 An important element of the bill is ensuring a balance between attracting investment to the new CCS industry and protecting pre-existing rights of oil and gas producers. The committee believes the bill seems to get this balance right, although

there is inevitably some uncertainty about this judgement given the path-breaking nature of the legislation.

### **Recommendation 1**

**The committee recommends that the Senate pass the bill.**

### **Recommendation 2**

**The committee recommends that the operation of the bill be reviewed three years after its proclamation.**

5.9 The committee notes concerns expressed about the degree of ministerial discretion conferred by the bill, which may give rise to perceptions that at some time in the future decisions may not be always be made in the public interest. The committee therefore sees merit in the government considering establishing an expert panel, or committee, to advise the minister on matters such as balancing competing resource use between CCS operators and petroleum titleholders. In order to offer transparency of decision-making and to help build stakeholder and community confidence, the advice of the panel should be made public.

### **Recommendation 3**

**That the government consider establishing an expert panel to advise the minister on matters of site selection, licensing, regulation, monitoring and environmental impact and site closures. Such advice should be made public.**

5.10 The introduction of an emissions trading scheme, or a carbon tax, would provide an appropriate price signal for energy consumers to economise on energy usage and for energy producers to switch emphasis towards providing energy in ways involving less emission of CO<sub>2</sub> into the atmosphere. There is then no reason for the government to favour CCS techniques over other ways of reducing carbon emissions. For this reason, the committee is not convinced by arguments that the government should be subsidising users or providers of CCS by actively taking over long-term liabilities from them, either for demonstration or commercial projects.

5.11 As there appears to be some uncertainty around this point, it could be useful for this to be made explicit in either the legislation or accompanying statements.

5.12 Given that companies may not exist to take liability over the decades, or centuries, when stored CO<sub>2</sub> may leak out, the government should consider adding to the arrangements requiring companies to pay for future monitoring an amount as insurance to cover any future liability the company may be unable to meet.

#### **Recommendation 4**

**The committee recommends that the government reject calls for it to assume explicitly longer-term liability for any leakage from carbon storage projects. Rather, it should investigate the means by which those companies undertaking such projects can contribute to the future costs of coping with any such leakage.**

**Senator Annette Hurley**

**Chair**





## **Additional comments by Coalition senators**

Coalition senators believe that a more practical and workable and corporately realistic approach to the issues surrounding the long term risk and liability for the material sequestered is that it should be initially with the sequestration applicant for a period of twenty years after the issuing of the site closure certificate and thereafter devolve to the Commonwealth or the Joint Authority.

**Senator Dr Alan Eggleston**

**(Deputy Chair)**

**LP**

**Senator David Bushby**

**LP**

**Senator Barnaby Joyce**

**LNP**



## **Additional comments by Greens senators**

The Greens believe that the question of liability is, in many ways, the most important regulatory issue for the Government to settle with this legislation. Leaving the question unanswered is a recipe for ongoing uncertainty and expensive litigation.

Passing full liability onto the taxpayer is unacceptable. It would be a case of privatising profits and socialising risk, and since the risk will certainly outlive the companies involved, the Greens believe that the liability issue should be dealt with through payment of a bond to cover ongoing risk.

The Greens would delete the existing Recommendation 4 and replace it with the following:

The Committee recommends that the Government reject calls for it to assume longer term liability for any leakage from carbon storage projects, and also reject the entirely unsatisfactory option of leaving the question of liability unsettled in the legislation. Rather, the legislation should explicitly set out an independent process for determination of an adequate bond to be paid by companies to cover the full liability into the future.

**Senator Christine Milne**

**AG**



# APPENDIX 1

## Submissions Received

Submission Number	Submitter
1	ExxonMobil Australia Group
2	Australian Network of Environmental Defenders Officers Inc (ANEDO)
3	Monash Energy Pty Ltd
4	WWF Australia
5	Schlumberger Carbon Services
6 & 6a	BP Australia
7	Anglo Coal
8	Department of Industry and Resources (WA Government)
9	Woodside Energy Ltd
10	Greenpeace
11	Australian Petroleum Production & Exploration Association Ltd (APPEA)
12	Australian Coal Association & Minerals Council of Australia
13	Australian Coal Association; Construction, Forestry, Mining and Energy Union (CFMEU); Climate Institute; World Wildlife Fund (WWF)
14	Victorian Government
15	Cooperative Research Centre for Greenhouse Gas Technologies (CO <sub>2</sub> CRC)

## Additional Information Received

### TABLED DOCUMENTS

- Tabled at private briefing on Friday, 29 August 2008, Canberra. Dr Clinton Foster, Geoscience Australia, '*Storing CO<sub>2</sub> in geological formations*', Presentation to the committee.



# **APPENDIX 2**

## **Public Hearing and Witnesses**

### **FRIDAY, 29 AUGUST 2008 – CANBERRA**

- BEESLEY, Ms Anna, Legal Policy Team Leader, Climate Change, Energy and Earth Resources Policy, Department of Primary Industries, Victoria
- BOUNDS, Mr Roger, Project Director, Monash Energy Pty Ltd
- BRENNAN, Mr Dominic, Corporate Lawyer, Monash Energy Pty Ltd
- CAUGHT, Ms Kellie, Policy Manager, Climate Change, World Wildlife Fund
- FOSTER, Dr Clinton Bruce, Chief, Petroleum and Marine Division, Geoscience Australia
- HILLMAN, Mr Ralph, Executive Director, Australian Coal Association
- INGRAM, Dr Geoffrey Malcolm, Regional Manager Australasia, Schlumberger Carbon Services
- MARRIS, Mr Sid, Assistant Director, Corporate Affairs, Minerals Council of Australia
- MILLER, Mr John, Policy Officer, Carbon Capture and Storage Legislation Section, Department of Resources, Energy and Tourism
- NOLAN, Mr Mark Joseph, ExxonMobil
- OAKEY, Ms Helen Gail, Head of Political Unit, Greenpeace Australia Pacific
- ROCHON, Ms Emily, Climate and Energy Campaigner, Greenpeace International
- SCOTT, Ms Samantha, Director, Policy and International, Australian Coal Association
- SEWELL, Ms Margaret, General Manager, Clean Coal and CO<sub>2</sub> Storage Branch, Department of Resources, Energy and Tourism

- SEYMOUR, Mr Dale, Deputy Secretary, Energy, Resources and Major Projects, Department of Primary Industries, Victoria
- TONI, Mr Paul, Program Leader, Development, World Wildlife Fund Australia
- van NISPEN, Mr Daniel, Head of CCS, Monash Energy Pty Ltd
- WALKER, Mr Ian James, Senior Policy Adviser, Resources Division, Department of Resources, Energy and Tourism
- WALMSLEY, Ms Rachel Louise, Policy Director, New South Wales Office, Australian Network of Environmental Defenders Offices
- YOUNG, Mr Robert B, Manager, Issues and Government Relations, ExxonMobil

#### **MONDAY, 1 SEPTEMBER 2008 – CANBERRA**

- CLYDSDALE, Ms Elizabeth Helen, Offshore Development Approvals Coordinator, Woodside Energy Ltd
- CUMMING, Mr Francis Alexander, Browse Assurance Manager, Woodside Energy Ltd
- DADDO, Mr Simon Courtney, Special Counsel, Woodside Energy Ltd
- GRAZIA, Mr Niegel John, Vice-President, Government Affairs, Woodside Energy Ltd