

SENATE ECONOMICS COMMITTEE:

Inquiry into Exposure Draft Legislation for Greenhouse Gas Storage



Submission by ExxonMobil Australia Pty Ltd

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Executive Summary

- Managing the risks from increases in global greenhouse gas (GHG) emissions is an important concern for ExxonMobil, industry and governments around the world.
- Carbon capture and storage (CCS) is a promising option in managing this risk, particularly as many companies, including ExxonMobil, have industrial-scale experience with its component technologies (capture, transport and storage).
- With nearly 60 percent of global fossil fuel CO₂ emissions coming from large point sources such as electricity generation plants, CCS applied to such facilities offers the potential to address a significant fraction of global emissions.
- ExxonMobil is a world leader in carbon management technologies, having researched, developed and applied carbon-handling technologies for more than 30 years. However, large scale integration of the capture, transport and storage components in a large point source CCS application (such as electricity generation plants) remains to be fully demonstrated.
- One of the best-known and longest-running CCS projects is in the Sleipner Field in the North Sea - in which ExxonMobil shares ownership (32.24% working interest). The project has sequestered one million metric tons of CO₂ each year since 1998.
- In Australia, ExxonMobil with its joint venture partners in the Gorgon LNG Project is pursuing the largest commercial scale CCS project in the world. To date, the Gorgon CCS proposal represents the biggest single investment contemplated solely for the management of greenhouse gas emissions. Similar to Sleipner, this project provides demonstration of large scale commercial deployment of CCS technologies.
- The Bass Strait fields, which continue to be a major supplier of crude oil to Australia and one of the largest domestic gas sources on the Eastern seaboard, has the potential to be a candidate site for a future CCS initiative once depleted. It is our assessment that there may be depleted reservoirs available for CCS in the Gippsland Basin in the 2025+ timeframe, although this timeframe remains uncertain as production technology development continues to extend the life of the fields.
- Against this background ExxonMobil is well placed to comment on the *Offshore Petroleum Amendment (Greenhouse Gas Storage) Bill 2008*. We believe the Bill establishes a framework that is suitable for adoption on a national basis and uses an appropriate regulatory framework analogous to petroleum regulation in Australia.

- Any regulatory framework should recognize that the injection of CO₂ into or near operational oil and gas facilities not designed for exposure to CO₂ presents potentially significant safety and operational risk and integrity issues to personnel, production and infrastructure. It is our view that the Bill recognises these concerns and provides mechanisms to avoid significant impact on pre-existing petroleum operations.
- While cautious about overlapping leases or licenses established in the Bill, the proposed legislation supports the objective of protecting the sanctity of existing property rights conferred on existing petroleum title holders.
- ExxonMobil retains concerns about some aspects of the Bill that may act as obstacles to establishing the investment and legal certainty required to enable broad, large scale deployment of CCS. In particular, we would highlight to the Committee the Bill's failure to address site closure approval timing and long term responsibility management as two key areas that require review and enhancement to ensure the viability of CCS.
- We would also encourage the Committee to examine conditions associated with Post Commencement Petroleum Titles and the injection of GHG for petroleum operations as two areas that require clarification for petroleum producers.
- While supportive of the overarching framework of the Bill, we note there is wide discretion in a range of matters in key areas that the Bill does not provide explicit definition (e.g. public interest, significant impact). We therefore encourage the addition of general requirements to more clearly define roles and terms to provide clear guidance as to legislative intent.

Introduction

ExxonMobil understands that the Senate Economics Committee is inquiring into the *Offshore Petroleum Amendment (Greenhouse Gas Storage) Bill 2008* (the Bill).

If enacted as currently drafted, the Bill will establish a regime within the Offshore Petroleum Act of 2006 (OPA) for the injection and storage of greenhouse gases (GHG) in deep sea-bed geological formations in the "Offshore" areas of Australia.

ExxonMobil commends the work of the Minister and the Department of Resources Energy and Tourism in preparing the Bill and is pleased to be invited to make comment.

About ExxonMobil

Globally, Exxon Mobil Corporation – the parent company of ExxonMobil Australia - is the world's largest publicly traded oil and gas company. Worldwide the company and its subsidiaries produce more than 4.5 million oil-equivalent barrels of energy resources every day from some 1600 fields and operate in over 200 countries. Exxon Mobil Corporation is also the world's largest non-government marketer of natural gas and in our global downstream business the company has interests in 38 refineries, 49 chemical plants and manufacturing facilities, and over 32,000 service stations world-wide.

ExxonMobil Australia

ExxonMobil Australia and its subsidiaries (ExxonMobil) play a significant role in the development of Australia's oil and gas resources and have a business history in this country stretching back more than 110 years.

ExxonMobil is Australia's largest integrated petroleum company. Our activities cover exploration and production of oil and gas, petroleum refining and marketing of fuels (including natural gas), lubricants, bitumen and chemical products.

ExxonMobil is a substantial investor in the Australian economy and a major contributor to the wealth of the nation. Annually ExxonMobil pays around A\$800 million in taxes to local, State and Federal Governments. Our cumulative investments in Australia exceed A\$13 billion and we provide direct employment for around 1700 people and indirect employment of tens of thousands more.

Bass Strait

ExxonMobil's Bass Strait (Gippsland) production operations have produced almost two-thirds of Australia's cumulative oil production and almost 30 percent of Australia's gas production. Just how significant Bass Strait has been in underpinning the economic growth of Australia is seen in the following modelling produced by Econtech (2007). Oil and gas production in Bass Strait has:

- Contributed over \$200 billion to Gross Domestic Product (GDP) over its life or some \$2.2 billion per annum in nominal terms;
- Has stimulated approximately 50,000 permanent additional jobs in Victoria (14,000 in regional Gippsland alone); and
- Generated approximately \$300 billion in Federal Government revenues in real terms (2.1 percent of all Government revenues collected in the last 40 years).

Bass Strait continues to be a major supplier of crude oil to Australia and one of the largest domestic gas suppliers to Eastern Australia with approximately seven trillion cubic feet (TCF) of remaining gas resources. ExxonMobil is also progressing new gas developments in Gippsland, which are the largest gas projects on the eastern seaboard. Combined the Kipper and Turrum projects hold resources of almost two TCF of gas and 140 million barrels of liquids and are critical elements in securing the long term gas supply needs of Eastern Australia and in particular Victoria. Against this background we estimate that Bass Strait has over 30 years of gas still to be produced and over 20 years of liquids.

There is also strong potential to extend the producing life of Gippsland even further as improved technology, particularly related to seismic processing, analysis and drilling capabilities, are playing an integral part in identifying further significant gas and liquids resources. In fact due to advances in technology, we have added approximately one TCF of gas to our resource base since 2004 and added over 30,000 barrels of oil per day to production in 2007 alone.

The Gippsland Basin has potential storage formations for future CCS projects. It is our assessment that there may be depleted reservoirs available in the Gippsland Basin in the 2025+ timeframe although this remains uncertain as production technology development continues to extend the life of the fields. It should however be recognized that the injection of CO₂ into or near operational oil and gas fields within the Gippsland Basin presents significant safety and operational risk and integrity issues to personnel, production and infrastructure. These risks and integrity issues are driven by the fact that none of the Gippsland Basin facilities have been designed for exposure to or handling of CO₂ or its by products. These risks in Gippsland may not be manageable from either a technical or cost perspective. The potential risks, if any, for a given storage basin are site specific and should be assessed on a case by case basis.

The Promise of Carbon Capture & Storage

At ExxonMobil our approach is to take sensible actions now to improve energy efficiency and reduce GHG emissions, while pursuing research designed to better understand scientific issues and to achieve technology breakthroughs that could dramatically reduce future emissions.

One area of technology that we believe holds major promise is the development of CCS systems. With nearly 60 percent of global fossil fuel CO₂ emissions coming primarily from large point sources such as electricity generation plants, CCS applied to such facilities offers the potential to address a significant fraction of global emissions. The challenge in the near-term is to make CCS an efficient, acceptable, and broadly applicable technology option.

The CCS process employs three core components: capturing CO₂ from gas streams and compressing; transporting from the capture facility to a deep geologic formation (storage site); and storing the CO₂.

Most current capture technologies are based on the use of a solvent to remove CO₂ from the gas stream. Capture is the most capital and energy intensive step of the CCS process. The most significant challenge is to apply CCS at large coal-fired power and large industrial combustible sources with capture technologies and infrastructure that are reliable, efficient and cost-effective. Significant research and technological advancement are being investigated.

The second component is transporting. As the capture facility is likely to be positioned at a distance from a storage site, moving the CO₂ through a pipeline from the capture facility to the storage site will be necessary infrastructure that utilizes advanced technology and extensive quality control procedures to ensure the integrity of the lines.

The third component, storage, includes injection facilities, monitoring and ensuring the integrity of the sites. A defined regulatory process will need to be in place that includes a timeframe for post closure monitoring and a transfer process to an entity for long term responsibility.

With a deep base of technical knowledge and a long-term commitment to continuous improvement in environmental performance, by safely and effectively decreasing GHG emissions derived from fossil fuels, ExxonMobil is active in the evaluation and adoption of CCS around the world.

ExxonMobil and Carbon Capture and Storage

ExxonMobil is a world leader in carbon management technologies and has researched, developed, and applied carbon-handling technologies for more than 30 years. All of the important components of the CCS process (capture, transport and storage) are practiced commercially today at industrial scale by ExxonMobil.

For example, ExxonMobil has been involved with CCS in the North Sea Sleipner gas field where over one million metric tons of CO₂ have been sequestered each year since 1998. The company is working with the European Commission and other companies on the CO₂ReMoVe project to evaluate a range of carbon injection and storage technologies in Norway, Algeria and Germany, and also participating in the U.S. Department of Energy's Southeast Regional Carbon Sequestration Partnership.

ExxonMobil also recently announced that we are committing more than \$US100 million to complete development and testing of an improved natural gas treating technology for CO₂ removal called Controlled Freeze Zone™ technology (CFZ™) that could make carbon capture and storage more affordable and significantly reduce GHG emissions. ExxonMobil plans to build a commercial demonstration CFZ plant near LaBarge, Wyoming.

In addition, ExxonMobil supports CCS research at the International Energy Agency's Greenhouse Gas Research & Development Program, and programs at leading Universities including Massachusetts Institute of Technology, Georgia Tech, the University of Texas and Stanford University.

ExxonMobil's Australian CCS Experience

In Australia, ExxonMobil with its co-venturers in the Gorgon Project are pursuing the largest commercial scale CCS project in the world. The Gorgon CCS proposal represents the biggest single investment to date contemplated purely for the management of greenhouse gas emissions. At present, the geo-sequestration of CO₂ provides no financial benefit to the proponents of the Gorgon Project, and represents a significant and costly "beyond no regrets" measure for GHG management in Australia.

As part of the project proposal, the Gorgon proponents have been studying and forwarding the technical and commercial viability of separating CO₂ from the Gorgon gas field and injecting it into a saline reservoir about 2500 metres beneath Barrow Island (BWI). These formations are overlain by regional geological seals that are expected to be effective in preventing the upwards movement of CO₂ into oil producing reservoirs or to the surface.

ExxonMobil has worked locally with the Co-operative Research Centre for Greenhouse Gas Technologies on a feasibility study for the storage of coal emissions in the Gippsland Basin (the findings of which and our commentary are attached in the technical Appendix 1). We have undertaken initial technical work to simulate potential CO₂ migration in the Gippsland Basin and we have shared that work with Geoscience Australia, the Department of Resources, Energy and Tourism and the Victorian Department of Primary Industries (attached in Appendix 2).

Regulating Carbon Capture and Storage

ExxonMobil is supportive of the development of appropriate regulatory frameworks to help facilitate the deployment of CCS technology. Our view is that an effective regulatory regime should:

1. Provide for a system that is compatible with, and leverages off, existing mineral and petroleum regulations and customary practice;
2. Establish appropriate protections for existing title holders (i.e. property rights);
3. Provide legal and investment certainty (i.e. liability issues during CCS and long term responsibility associated with storing CO₂); and
4. Limit the regulatory burden, impacts and interactions on future petroleum activities.

Against this background, ExxonMobil provides the following detailed comments on the Bill.

General Overview

ExxonMobil believes that the Bill establishes a framework that is suitable for adoption on a national basis by using a regulatory structure analogous to petroleum regulation in Australia. In particular, we note and support the intent of the provisions of the Bill designed to protect the rights of existing petroleum license holders. ExxonMobil retains concerns about some aspects of the Bill that may act as obstacles to establishing the investment and legal certainty required to enable broad, large scale deployment of CCS.

1. A National GHG Storage Regime

Existing mineral laws, regulations, and operational practices in place in most parts of the world provide a sound basis for adaptation to CCS. The Bill establishes a legal framework that is suitable for adoption on a national basis that is analogous to petroleum titles under the Commonwealth *Offshore Petroleum Act 2006* (Cth) (OPA). We note that the Bill will establish a staged development process similar to that for petroleum titles under the OPA and we are support the key elements outlined.

This process involves:

- The first step is for an applicant to obtain a **GHG assessment permit** (akin to a petroleum exploration permit) allowing the holder to explore for suitable GHG storage formations. A GHG assessment permit has a term of six years and cannot be renewed.
- Once identified, the permit holder can apply for a **declaration of identified GHG formation**. There are various stages to this declaration. The declaration continues for the life of the GHG project.
- A GHG assessment permit holder can then apply for either a **GHG holding lease** (where the GHG source is not available for injection within five years) or a **GHG injection licence** (where the GHG source is available for injection within five years) in respect of a block containing an identified GHG formation. A GHG holding lease has a term of five years and can be renewed once. The lease holder must be able to inject GHGs within 15 years.

- A GHG injection licence authorises the injection and storage of GHGs in identified storage formation(s) subject to various requirements including a detailed site plan and site closing works program. A GHG injection licence remains in force indefinitely until a **site closing certificate** is issued by the Minister, and the licence holder is then able to surrender the license. There is, however, no obligation on the Minister to grant a site closing certificate.
- Slightly different provisions apply where the applicant for a GHG injection licence is the holder of a petroleum production licence for the same area.
- Titles may be granted where "impacts tests" are satisfied and once granted, may be cancelled for non-use for continuous periods of five years or more.

The Bill will create a number of new GHG instruments that mirror existing petroleum instruments under the OPA which we would also support.

New GHG titles/declarations	Existing petroleum titles/declarations
GHG assessment permit	Petroleum exploration permit
Declaration of identified GHG storage formation	Declaration of petroleum location
GHG holding lease	Petroleum retention licence
GHG injection licence	Petroleum production licence
GHG search authority	Special prospecting authority
GHG special authority	Access authority
GHG infrastructure licence	Infrastructure License

While we believe that this philosophical approach is appropriate, in so far as it provides a predictable and transparent system, we remain concerned in regards to Ministerial discretions. The Bill appears to provide the Minister with powers in relation to the conditions that may be attached to GHG titles (subject to administrative law principles) together with wide and significant powers to issue directions to GHG title-holders which extends, in certain circumstances, to suspending or cancelling a GHG title. Such wide ranging discretion could create uncertainty with respect to GHG titles. Given the long term and large investments required of any CCS project, consistency and predictability in policy and process are critical to ensure investor confidence. As such, clearer definition of these discretionary powers should be incorporated into the Bill.

2. Protections for Existing Title Holders

Protection of Pre-existing Property Rights

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. Most of what law exists appears to be regarding natural gas storage, which is a similar activity to CCS in practice.

The Bill provides for a regulatory framework of overlapping rights with respect to oil and gas production and the use of geological pore space and GHG storage. In doing so the Bill does seek to provide protection for existing petroleum titles. This level of protection depends on whether the petroleum title came into being before or after the commencement of the amendments that the Bill will introduce.

With respect to existing title holders and their property rights, the Bill identifies and defines a "pre-commencement" petroleum title as a petroleum exploration permit, petroleum retention lease or petroleum production licence that is in force at the time when the amendments contained in the Bill commence, and any future petroleum title in the same series. This includes a petroleum retention lease granted to the holder of a life-of-field production licence that was itself a pre-commencement title.

The Bill provides pre-commencement petroleum title-holders with "protections" where there is potential for "adverse impacts" from new GHG operations through:

- Imposition of conditions on GHG assessment permits and GHG holding leases;
- Ministerial directions to GHG title-holders;
- Limitations on the circumstances in which GHG injection licences are granted/ refused;
- Treatment of petroleum discoveries in certain circumstances; and
- Provisions for GHG injection licensee remedial works.

A key feature of the Bill in attempting to address the protection of property rights of pre-existing titleholders is the provision relating to the grant of a GHG injection licence to the holder of either a GHG assessment permit or a GHG holding lease. The Bill requires that before granting a GHG injection licence the Minister must be satisfied that:

- (a) there is no significant risk that operations under the injection licence will have a significant adverse impact on petroleum operations under:
 - An existing or future pre-commencement petroleum title; or
 - An existing petroleum production licence; or

- The holder of the affected petroleum title has agreed to the grant of the injection licence and the terms of that agreement are approved for registration.
- (b) If the proposed injection licence area overlaps a pre-commencement petroleum title or a production licence area, and a block in the area of overlap contains commercially viable petroleum, there is no significant risk of a significant adverse impact on the recovery of the petroleum. (Note that this "test" refers to a petroleum discovery already made before the application for the injection licence is decided. For discoveries after the injection licence is granted, separate provisions apply).

ExxonMobil's view is that 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 and integrity issues to personnel, production and infrastructure. For example, in the Gippsland Basin, these risks and integrity issues are driven by site specific geologic concerns and the fact that none of the facilities have been designed for exposure to or handling of CO₂ or its by products. While concerned about overlapping leases or licenses, ExxonMobil believes the proposed legislation supports in principle the objective of protecting the sanctity of existing property rights conferred on petroleum title holders.

While we note and support guidance on the Bill that states that the "impacts" of key GHG operations are defined to include impacts at both the level of geological formations and physical interference on the surface with a petroleum title-holder's operations, it is important that an appropriate definition of 'significant adverse impact' is established. We understand that it is the government's intention for this definition to be dealt with by regulation, however ExxonMobil's view that statutory definition of the term would be extremely valuable in guiding development of regulations.

Protection of Petroleum Discoveries

The Bill also seeks to provide protection for petroleum discoveries made after a GHG injection licence is in place in areas where a GHG injection licence overlaps the area of a pre-commencement petroleum title held by a person other than the injection licensee (section 249CZC). The section applies where:

- The petroleum is commercially viable, or likely to become commercially viable at some time in the future; and
- There is a significant risk that injection and storage operations under the GHG title will have a significant adverse impact either on recovery of the petroleum or on its commercial viability; and

- The petroleum title-holder has not agreed in writing to the carrying on of the injection and storage operations.

In such circumstances, the Minister must:

- Direct the GHG injection licensee for the purpose of eliminating the risk, or where it is not possible to eliminate the risk, direct the injection licensee for the purposes of mitigating, managing or remediating the risk; or
- Suspend, either for a specified period or indefinitely, all or any of the rights conferred by the GHG injection licence; or cancel the GHG injection licence.

The Minister's directions to the GHG injection licensee may extend outside the GHG licence area, which may, be part of an existing petroleum title. In such cases, the title-holder of the affected area must be notified and their submissions taken into account by the Minister. ExxonMobil supports the above provisions in the Bill. However, we note that the Bill requires a CCS proponent to advise the Minister of any hydrocarbon discovery, but remains silent with respect to the Minister's obligation to advise the title holder with respect to any find.

ExxonMobil believes the requirements of the Minister in such a scenario need to be clarified as petroleum 'discovered' within an existing petroleum title clearly falls within the ownership of the petroleum title holder(s). Given that a CCS proponent has no legal right to explore for petroleum, the intellectual property of the discovery should not reside with the proponent and should be made available to the holder of any existing petroleum title over the acreage. Should no petroleum title holder exist, intellectual property rights should reside with the Commonwealth Government.

Protecting Current Rights to Inject for Business Purposes

It is intended that holders of petroleum production licences will continue to have the ability that they currently have under section 137 of the OPA and (subject to obtaining normal regulatory approvals) to do whatever is necessary in the licence area for the purpose of recovering petroleum in the licence area, including:

- Injecting methane and/or carbon dioxide in the licence area for gas recycling or enhanced petroleum recovery; and
- (subject to approval) Injecting for disposal in the licence area methane or carbon dioxide stripped from the petroleum stream that is recovered in the licence area.

ExxonMobil supports the intent of the Bill in this regard as the OPA and its predecessor has always clearly defined the rights and obligations of petroleum producers to inject CO₂ or gas for business purposes in Australia, such as enhanced oil recovery. However, we note that the

language used in the Bill may unintentionally restrict this right to the specific licence area where the material originated. ExxonMobil believes clarification of this point is necessary in ensuring the intent of the provision is met and that current rights are preserved.

As part of an upcoming project we have development plans in place to inject the total produced gas stream from one licence area (Field A), which includes CO₂, into one of the reservoirs in another licence area (Field B), where injection of produced gas from Field B is already underway. The additional Field A gas injection will increase oil and gas recovery from Field B. The injected gas from both fields will be produced and sold at a later time. This process is not only important in enhancing the project economics but provides a greenhouse benefit as a portion of the CO₂ injected into Field B will remain in place at depletion. It is also noteworthy that the gas being injected would not be currently proscribed as a GHG under the London Protocol definition.

A further consideration of injection for business purposes is the recognition that often, CO₂ recovered from production from offshore fields will be recovered by onshore facilities, reflecting a mix of all fields/licences producing to the plant. In such cases, injection for either improved hydrocarbon recovery or disposal will not be on the licence area where the CO₂ was produced. ExxonMobil recommends revising the text of Section 137 (1)(c) to read "in **any** licence area."

3. Legal and Investment Certainty

Long Term Responsibility for Carbon Storage

A core issue that must be addressed before CCS can be widely implemented is the management of long term responsibility associated with carbon storage sites. The Bill should authorize development of clear regulatory standards and processes that, when satisfied, allow the transfer of long term ownership and responsibility of a decommissioned GHG storage site. ExxonMobil argues that the government (or government approved entity) should accept this responsibility at such time where a GHG title-holder demonstrates compliance with reasonable closure standards and requirements. It is also important to recognize that since it is unlikely that most corporate entities would survive the length of time thought to be necessary for meaningful GHG storage (1,000 years is the common reference), it is appropriate that some form of competent authority or entity clearly accept this responsibility.

Essentially the Bill leaves GHG title-holders liable indefinitely (subject to statutory limitations periods), so long as the GHG title-holder entity continues to exist. This creates a degree of uncertainty that will inhibit investor confidence and reduce the viability of CCS.

The standards for GHG site closure should generally be performance and risk based as opposed to precautionary based. Ownership of injected CO₂ and any remaining tangible assets should transfer with the transfer of long term responsibility. With transfer of responsibility, the competent authority should fully indemnify and hold harmless the title holder unless clear and convincing evidence of intentional misconduct or willful violation of permits, regulations or laws can be shown.

Unfortunately the Bill remains silent on the issue of long term responsibility relying on the common law, which is largely undefined in the context of GHG storage, to deal with matters that may arise. Clearly addressing the issue of long term responsibility management, in a way that provides legal and regulatory authority for development of clear and sound closure standards and processes, will improve investor confidence and potentially avoid protracted and unproductive legal proceedings. Such handling of long term responsibility also better protects public interests.

Liability During Sequestration

A key concern associated with any framework of overlapping title relates to potential situations where a GHG injection and storage project impacts an existing petroleum title holder - for example where the sequestration of GHG impacts on the quality or integrity of petroleum in a reservoir or adjacent geologic formations, puts wells or facilities at risk, or substantively affects the ability to conduct future operations. The Bill is silent on any specific liability regime for GHG injection and storage and relies on common law principles. ExxonMobil believes the lack of an effective statutory regime for enforcing liability in such a scenario as outlined above provides inadequate protections to petroleum producers and may not sufficiently encourage the requisite level of care and prudential supervision of CCS proponents in reviewing their proposals for project sites or their operations.

Site Closing Certificates

Under the Bill a site closing certificate will be required before a GHG injection licensee can surrender the licence and leave the site. An application for a site closing certificate must be accompanied by a variety of information including modelling of the behaviour of the injected GHG and its expected migration pathway(s), and suggestions for post-closure monitoring, measurement and verification (MMV). Post-closure MMV will be undertaken by the Commonwealth at the cost of the GHG licensee (section 249CZM).

After the application for a site closing certificate has been made, the licensee will be required to carry out a work program (similar to a petroleum decommissioning process, but may include additional requirements). The work required may be within the licence area (for example, plugging of wells, repairing damage to seabed) or outside the licence area (for example, plugging of abandoned gas wells to ensure that GHG does not escape).

The Bill then provides for the issue of a "pre-certificate notice" that will set out the Commonwealth's post-closure MMV requirements and the amount of security required from the licensee (section 249CZGA). Once a pre-certificate notice has been granted and the licensee lodges the security specified in the pre-certificate notice, the Minister must issue to the applicant the site closing certificate.

The Bill does not provide a set timeframe for the Minister to grant a pre-certificate notice and could effectively defer this decision indefinitely (section 249 CZFA) leaving a GHG injection licensee "in limbo" in the site closing period. This significant discretion will affect the legal and investment certainty of GHG operations in relation to a site closing certificate. ExxonMobil believes that once a GHG site operator has met a set of clearly defined performance based closure standards, the Minister should be obligated to issue the pre-closure certificate in a timely manner.

Legal Certainty of GHG Titles

As mentioned previously, the Bill allows a high degree of Ministerial discretion, particularly with relation to GHG titles in terms of:

- Conditions that may be imposed;
- Ministerial directions that title-holders are required to follow;
- Ability to suspend or even cancel GHG titles; and
- Issuing a site closing certificate.

While the Ministerial discretions must be exercised lawfully, for a proper purpose and are subject to review in accordance with traditional administrative law principles, they could act as a disincentive and slow investment in GHG injection and storage operations if not described to a reasonable level of detail. ExxonMobil believes that the Bill should establish a legal framework for CCS that reasonably defines the limits of Ministerial discretion and provides the certainty and predictability to facilitate investment in CCS.

4. Impacts on Future Petroleum Industry Operations and Regulations

Post Commencement Petroleum Titles

The Bill imposes new terms and conditions on post-commencement petroleum titles. "Post-commencement titles" are those petroleum titles where the initial exploration permit in the series is granted *after* the Bill commences.

The Bill impacts on future petroleum operations under the OPA in the following ways:

- "Key petroleum operations" carried out under a "declared" (post-commencement) petroleum title must be approved by the Minister; and
- All post-commencement production licences must meet the "impact tests."

Approval of key petroleum operations required

Approval of key petroleum operations are required where any "key petroleum operation" in respect of a post-commencement petroleum title (exploration permit, retention lease and production license) will have a significant adverse impact on GHG injection and storage operations that are being, or could be, carried on under an existing GHG title. The Minister may determine that the title is "declared." For a "declared" title, the title-holder must not carry on those "key petroleum operations" without the approval of the Minister (sections 79 and 79A).

When approving key petroleum operations the Minister may impose further conditions on the title, for example, that wells are constructed to a standard that facilitates plugging of the wells in a way that will ensure suitability of the geological formation for storage of GHG. The "impacts" that these operations may have on GHG operations include, not only impacts at the level of geological formations but also physical interference on the surface with a GHG title-holder's operations.

ExxonMobil holds significant concerns around this section of the Bill as it provides a disincentive to future petroleum activity and potentially makes petroleum companies underwrite a portion of the commercial costs of CCS proponents. In addition this provision also raises the need for clarity around the responsibility accruing to pre-commencement title holders in scenarios where already properly abandoned wells are not deemed suitable for the storage of GHG. The Bill remains silent on this matter.

Impact tests

The Bill adds new "impact tests" for all post-commencement production licences (section 145). Note that this is the same test as applied to GHG injection licences that provides a "level playing field" for GHG injection licences and post-commencement production licences.

The Minister must be satisfied that each of the two tests below is met before granting a post-commencement petroleum production licence:

- (1) Either:
 - there is no significant risk that operations under the petroleum production licence will have a significant adverse impact on GHG operations under:

- an existing GHG assessment permit or holding lease; or
 - if there is an identified GHG storage formation in an existing permit or lease area, a future injection licence over the blocks in which that storage formation is located; or the grant of the petroleum production licence is in the public interest.
- (2) Either:
- (b) there is no significant risk that operations under the petroleum production licence will have a significant adverse impact on GHG operations being undertaken under an existing GHG injection licence; or the holder of the injection licence has agreed to the grant of the production licence **and** the terms of that agreement are approved for registration.

Effectively, the Bill does not give precedence to either GHG or petroleum applications but provides for a "public interest test" to enable the Minister to prioritise activities where they cannot co-exist. ExxonMobil recommends that, at minimum, the Bill include a definition of "significant adverse impact" or guidance as to what might be considered "significant adverse impact" for use in developing regulations. We respectfully reserve our right to comment on this section in more detail when we have seen how the "public interest test" will be defined in future regulations.

Keeping in mind the importance of energy to the Australian economy, this Bill should consider energy supply when evaluating CCS activities with petroleum activities. Petroleum operations have a relatively finite timeframe of activity and, if wisely executed, they will not affect the viability of future CCS operations. The reverse is not true of CCS operations, which can permanently preclude petroleum operations in an area.

Valuation and Incentives

ExxonMobil favours approaches to the valuation of carbon that create a basis for market principles to drive investment decisions for all forms of GHG mitigation, including CCS. The financial basis for greenhouse gas (GHG) mitigation, including CCS, should be driven by a GHG policy that provides a value for carbon that is implemented as widely across the economy as practical. The value of carbon should be the basis for selecting the most appropriate method of GHG mitigation without dictating or prohibiting a sound management approaches. In this context the Bill is seemingly compatible with the future development of an Emissions Trading System (ETS).

Appendix 1 – Technical Work on CCS in Gippsland

Latrobe Valley CO₂ Storage Assessment Project (LVCSA)

The LVCSA project conducted in 2005 provided a medium to high-level technical and economic characterisation of the volume and cost potential for secure geosequestration of CO₂ produced by the utilization of Latrobe Valley brown coal. It identifies key issues and challenges for implementation and provides a reference framework for the engagement of stakeholders, including the identification of items that will require further focused verification studies.

ExxonMobil was an advisory partner in the study and provided technical input on the Gippsland Basin, in particular its suitability for carbon storage. In participating, ExxonMobil also provided input on the potential risk of injection into operational oil and gas reservoirs.

The results of the LVCSA were preliminary in nature and included:

- Broad definition of the capacity of the Gippsland sedimentary basin to provide a high integrity storage site for CO₂ sourced from the Latrobe Valley over the long term;
- Scoping of the costs of providing transportation, injection and monitoring verification of CO₂ from the Latrobe Valley from commencement through until around 2050;
- Initial evaluation of the potential synergies and identification of issues associated with implementing the CO₂ storage project while oil and gas operations continue through to ultimate field depletion;
- Initial definition of an optimum CO₂ storage infrastructure roll-out plan including preferred injection locations;
- Definition of the specific uncertainties associated with implementation and specification of the work necessary to ensure that these are mitigated to the extent necessary;
- Collaboration during the assessment between Monash Energy, the CO₂CRC, the Federal and Victorian Governments and, ideally, key oil and gas producers operating in the area of prospective CO₂ storage; and
- A framework for engagement with community stakeholders.

ExxonMobil is broadly supportive of these preliminary findings but would like to highlight to the Committee a number of issues that make a definitive assessment of the viability of CCS in Gippsland premature:

Risks to Existing Petroleum Production

While the Gippsland Basin has potential as a candidate project for a future CCS initiative in the long term, it must be recognized that the injection of CO₂ into operational oil and gas fields in the Gippsland Basin presents significant safety and operational risk and integrity issues to personnel, production and infrastructure. These risks and integrity issues are driven by the fact that none of the Gippsland Basin facilities have been designed for exposure to or handling of CO₂ or its by products. The potential risks, if any, for a given storage basin are site specific and should be assessed on a case by case basis.

These risks in our view may not be manageable from either a technical or cost perspective. The report may be overly optimistic in its assessment that there may be depleted reservoirs available in the Gippsland Basin as early as 2015. ExxonMobil's assessment is that the 2025+ timeframe is a more realistic assessment, and even this remains uncertain as production technology development continues to extend the life of the fields.

Technical Issues Requiring Further Work

It should be stressed that different potential CO₂ storage sites have different physical characteristics. As such each must be considered on an individual basis and technical conclusions pertaining to one site may not be applicable to another. In the case of the Gippsland Basin the following issues were identified by ExxonMobil during the LCVSA study:

- *Migration uncertainties* - Studies to date offer a "coarse" and overly optimistic perspective on possible migration path for CO₂ injected up to 500 metres below existing productive horizons given the unknown characteristics of vertical migration conduits.
- *Risks of CO₂ leakage to seafloor* - Exploration and production wells which are to be permanently abandoned (in compliance with PSL Act) are for existing reservoir fluids, not injected CO₂. Therefore the ability of abandoned wells to contain CO₂ within the intended sub-surface reservoir zones, or viability of remediation of such wells, has not yet been adequately established. The ability of the geological sub-strata to also contain CO₂ within reservoir sections also requires further investigation in light of naturally occurring gas escape features having been identified on the Gippsland Basin oil fields.
- *Integrity implications for personnel safety and existing production facilities* - in the event of earlier-than-predicted CO₂ arrival. The facilities were designed for existing fluids and would require large investment for re-build to provide for the safety of operators and the integrity of production facilities.

- *ExxonMobil facilities not appropriate for CO₂ injection hubs* - Gippsland Basin Production facilities are designed to optimally handle hydrocarbon production, not the injection of CO₂.
- *Fields' geology and geometries* - Gippsland fields have limited potential for CO₂ injection to be utilized as a secondary recovery enabler due to the nature of the fields' geology and geometries.

In summary, the LCVSA project was a preliminary assessment of the risks and uncertainties of a major infrastructure investment. While the study shows that there is a sound technical basis for the Gippsland Basin to be considered as a potential CO₂ storage site further analysis is required before the commercial and technical viability of any CCS project in Gippsland can be determined. A full copy of the report is publicly available at www.Co2crc.com.au.

Appendix 2 – Technical Work on CCS in Gippsland

CO₂ Simulation in Gippsland

In 2007, ExxonMobil performed initial technical work to simulate potential CO₂ migration following injection underneath the Kingfish field, which had been proposed as a possible scenario as part of the Latrobe Valley CO₂ Storage Assessment Project (see Appendix 1). We have shared that work with Geoscience Australia, the Department of Resources, Energy and Tourism and the Victorian Department of Primary Industries.

While this assessment was a screening study, and therefore lacked the depth and maturity of a more detailed technical assessment, simulation modelling suggested early breakthrough of CO₂ into the producing Kingfish formation was possible if not likely to occur within production life. The key mechanism allowing this to occur was the buoyancy of the CO₂ and lack of effective flow barriers (sealing formations) to prevent vertical migration.