Australian Government
Department of Industry, Science and Resources

Offshore carbon capture and storage (CCS) review

Key findings and next steps

Summary

This paper summarises the key findings of a review of the regulatory framework for Offshore Carbon Capture and Storage (CCS) established under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGS Act). This framework applies to Offshore CCS activities in Commonwealth waters.

The review drew on insights generated through engagement with title holders, industry stakeholders, industry regulators, and other Commonwealth agencies.

Overall, the review found that the offshore CCS regime under the OPGGS Act is working as expected in the current market context and is still largely fit for purpose in a decarbonising economy.

In addition, engagement undertaken with industry stakeholders and titleholders suggests the regime is internationally regarded as a robust framework for offshore CCS.

The review identified improvements that would help to 'future proof' the regulatory framework, so it is consistent with an industry operating at scale and supports the expected contribution of CCS to Australia's 2050 commitments.

The focus of these improvements would be on technical and administrative legislative updates to support innovative business models, improve the efficiency of administrative and regulatory processes, and manage fiscal risks.

Specific reform opportunities are discussed in more detail in the 'Findings' section of the report.

Implementation would require amendments to the OPGGS Act and associated regulations.

Sectoral overview

Globally, deployment of carbon capture and storage (CCS) projects continues to accelerate. In 2025, there was significant progress in policy, legal and regulatory frameworks worldwide to support and incentivise CCS deployment. At least 70 CCS facilities are in operation worldwide and more than 700 projects under development.[1]

Australia's CCS industry remains relatively nascent but active. There are 18 geological storage projects across Australia, of which 2 are operational: the Gorgon CCS project in Western Australia and the Moomba CCS project in South Australia. Both projects are onshore, while offshore CCS projects remain in the early stages of development.

- The Chevron-operated Gorgon LNG project is the world's largest commercial CCS project. Between 2019 and 2025, the project has stored more than 12 million tonnes of CO_2.
- The Moomba CCS project commenced operations in 2024 and has already stored approximately 1.57 million tonnes of CO_2.
- Collectively, the volume of CO_2 sequestered through these two projects is close to the annual emissions generated by Australia's residential and commercial buildings sector.

All current offshore CCS projects in Australia are in the exploration phase, with proponents identifying prospective storage locations, CO_2 sources and assessing technical and commercial feasibility. Projects are under development in several offshore sedimentary basins, including the Bonaparte, Browse, Gippsland and Otway basins. Consistent with global trends, most of these projects are linked to natural gas processing facilities as one of the lowest-cost applications for CO_2 capture.

Australia is well positioned to support CCS deployment due to its extensive offshore storage geology, world-class scientific and engineering capability, and existing operational experience. These strengths are complemented by comprehensive regulatory frameworks, established offshore infrastructure, and proximity to high-emitting economies in the Asia-Pacific region.

Governments across the region have made progress in developing CCS regulatory regimes, although few match the breadth and maturity of Australia's framework. This places Australia in a strong position to act as a potential CCS hub for both domestic and international carbon sequestration. Australia is progressing bilateral negotiations with key partners, including Japan and the Republic of Korea, to facilitate the cross-border transport of CO_2 for safe and permanent storage in Australia. Successful

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[1] *The Global CCS Institute 2025 reports that there were 77 CCS facilities operating worldwide in 2025, compared to 50 in 2024 and a further 734 CCS facilities in the development pipeline.* *https://www.globalccsinstitute.com/resources/global-status-report/*
According to International Energy Agency's (IEA) 2026 CCS project database, 86 projects are now operational with 884 projects either planned or under construction. *https://www.iea.org/data-and-statistics/data-product/ccus-projects-database*
Note: The IEA only includes facilities with capacity of more than 100,000 tonnes/year (or 1000 tonnes/year for direct air capture facilities). GCCSI includes all facilities where CO_2 is captured and transported for permanent storage as part of an ongoing commercial operation.

bilateral agreements to support cross-border transport will increase the potential volume of storable CO_2 for Australian offshore CCS projects.

CCS is critical to securing the reduced emissions required by Australia's 2050 targets and international obligations. It is also important for addressing hard-to-abate emissions from sectors such as cement production and metal refining that cannot use other decarbonisation options. Hub-style infrastructure and arrangements that collect, aggregate and transport CO_2 may be a viable abatement pathway for these types of industrial activities.

Australia's greatest storage potential is offshore. Geoscience Australia indicates that a substantial proportion of Australia's geological storage capacity is in offshore saline aquifers and depleted fields in Victoria, Western Australia and the Northern Territory. Offshore storage also offers the scale and permanence required for long-term emissions abatement that cannot be readily achieved through onshore options alone.

Context of the review

The offshore CCS regulatory regime was established in 2008 through amendments to the OPGGS Act with bipartisan support. This was supported by substantial CCS investment and research funding in the 2009-10 Budget.

The review of the Offshore CSS Regime was initiated in 2023 to advise government on critical issues affecting the development of the CCS industry. Consistent with the terms of reference, the review focused on the CCS regulatory regime established under the OPGGS Act.

The review also considered how the OPGGS Act interacts with other relevant Commonwealth legislation, such as the requirements for CO_2 injection under the *Environment Protection (Sea Dumping) Act 1981* (Sea Dumping Act) and the assessment of CCS exploration and appraisal activities under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The objectives of the review were to:

- ensure the regulatory framework facilitates the emerging CCS industry and appropriately manages risk
- identify any regulatory duplication, areas of unnecessary administrative burden and opportunities to improve regulatory clarity, while facilitating consistent and transparent decision making across government
- ensure the regulatory regime is fit for purpose and reflects best practice.

The review included industry engagement through a titleholders working group. This engagement provided useful insight into technical aspects, industry investment trends, potential revenue models, and the role of enabling infrastructure, such as aggregation hubs. Additional technical input was commissioned when necessary.

Discussion with key regulators and other relevant agencies, including the National Offshore Petroleum Titles Administrator (NOPTA) and the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), the Department of Climate Change, Energy, the Environment and Water (DCCEEW), and Geoscience Australia, were ongoing throughout the review. Consultation identified issues including:

- overlapping regulatory processes and dispersed information
- complexity and administrative burden during project application and approval phases.

These matters were considered alongside an assessment of the existing legislative and regulatory framework and relevant legal advice. The review deliverables were to:

1. ensure appropriate policy and regulatory settings appropriately manage risks across the lifecycle of offshore CCS activities, from exploration to decommissioning of CCS project assets
2. examine applicable Commonwealth legislation to identify duplication in CCS assessment processes and options for improvement, including potential accreditation or streamlining to enable NOPSEMA to act as the environmental regulator under national environmental law.

Key findings

Overall, the OPGGSA regulatory framework does not appear to be a material barrier to the development of the offshore CCS industry in Australia. Additionally, the offshore CCS regime in the OPGGS Act is still largely fit for purpose in a decarbonising economy. The review did however identify some legislative duplication between the OPGGS and EPBC Acts and identified a need for improved information sharing provisions to support cross-agency collaboration. This will reduce the need for proponents to submit the same information to different agencies.

Additional issues related to the CCS legislative landscape and other regulatory matters that required further investigation were also identified, including:

- lack of regulatory clarity and need for simplification on transition pathways for petroleum operations to enter the CCS industry
- re-use and re-purposing of offshore petroleum equipment for CCS projects
- improved monitoring settings both during and post injection, including new requirements for CCS metering infrastructure
- shifting post-injection monitoring responsibilities from government to titleholders
- several administrative and regulatory refinements to improve processes, clarify requirements and simplify arrangements.

Issue 1: Regulatory duplication and information sharing (implemented)

Substantial duplication was identified across approval processes under the OPGGS Act, the EPBC Act and the Sea Dumping Act. Long-standing arrangements for petroleum activities are in place so that those activities, once approved under the OPGGS Act, do not require a separate approval under the EPBC Act. However, these arrangements do not extend to offshore CCS activities. To address this, recent amendments to the EPBC Act provide a power for the Minister for Environment to declare that offshore CCS activities, once approved by NOPSEMA, do not require a separate (and duplicated) approval under the EPBC Act.

There is also duplication for CCS projects across the OPGGS Act and the Sea Dumping Act. Currently, offshore CCS projects would need to seek approvals under both the OPGGS Act and the Sea Dumping Act, which have similar regulatory requirements. In addition, potential legislative barriers to information sharing between regulators were also identified as an obstacle to coordination between the regulatory agencies.

Measures to address this duplication were included in the *Regulatory Reform Omnibus Act 2025*. The Act amends the OPGGS Act to explicitly enable information sharing between key government agencies on offshore petroleum and CCS matters.

Issue 2: Transitioning from petroleum to CCS

Provisions exist in the OPGGS Act for existing petroleum title holders to transition their activities to pursue dedicated greenhouse gas injection projections without having to go through the competitive acreage release process. However, CCS titles obtained through this process are 'tied' to the originating petroleum production title and additional restrictions on injection licenses apply, including:

- some or all the injected GHG substances must be derived from the originating petroleum process
- the storage formation must be wholly within the existing petroleum title area
- the duration of the GHG title is dependent on the petroleum title.

It is anticipated that improving the petroleum to CCS transition pathway will incentivise petroleum producers to reduce emissions by supporting transboundary movement of CO_2, enable the establishment of future CCS aggregation 'hubs', and align with government's net zero and productivity agenda.

Issue 3: Re-use and re-purposing of petroleum assets for CCS projects

Under current OPGGS Act settings the pathway is not clear for proponents seeking to repurpose petroleum infrastructure for CCS operations, or for its concurrent or sequential use under different petroleum and CCS titles.

Clarifying the re-purposing pathway for industry will provide greater certainty for CCS projects planning to adopt this approach and may also improve commercial viability. It is also anticipated that re-use and repurposing of assets promote industry development and align with the government's net zero and productivity agenda.

An option to clarify requirements is to develop and publish guidance material that outlines steps and expectations for titleholders seeking approval to re-use or re-purpose petroleum assets or infrastructure for CCS activities. However, it may also be necessary to complement guidance material with OPGGS Act amendments clarifying that maintenance and removal of property is an obligation on the titleholder.

Issue 4: Measurement, monitoring and verification (MMV) during injection

MMV settings underpin the collection and provision of information on the operation of CCS projects. This information is needed to verify that offshore CCS projects are operating within predicted and agreed parameters during the injection phase.

MMV requirements are largely implicit in nature and there is no clear guidance on expectations around what is acceptable during the injection phase of a CCS project. In addition, there are currently no explicit requirements for the installation of metering infrastructure to collect data on the amount of CO_2 injected and stored.

This gap could be addressed by making metering infrastructure a requirement for undertaking injection activities, which will provide baseline data for post-injection monitoring plans, enable accurate emissions reporting, and support transboundary CO_2 movement. This will also aid the potential future introduction of charging or taxation mechanisms.

Issue 5: Post-injection accountabilities

Under current settings, titleholders design and are financially responsible for a program of post-injection MMV activities once injection ceases. This MMV program is then undertaken by government. However, this approach introduces the potential for misaligned incentives and information asymmetries. It also increases financial and operational risk for taxpayers.

Titleholders have the operational and technical capabilities and (with appropriate government oversight) are best placed to undertake post-injection monitoring because of their operational experience and data collection throughout the project's life. Act amendments would be required to formalise the requirement for titleholders to fund and undertake post-injection monitoring. Consideration was also given to how post-injection monitoring obligations, closure planning and liability transfer arrangements could better reflect the site-specific risks and performance of individual projects.

Issue 6: Regulatory and administrative refinements

There are opportunities to improve regulatory clarity and streamline processes for offshore CCS project proponents through updates and refinements to the OPGGSA and associated regulations. These include aligning decision making for CCS with petroleum where appropriate, amending the definition of 'key greenhouse gas operations' to have a more focused scope, and addressing gaps in the CCS penalties provisions. This will help improve regulatory efficiency and create more effective decision-making pathways. The review also identified potential opportunities to clarify incident response powers, responsibilities and enforcement provisions relating to greenhouse gas leakage events.

Next steps

Changes to address issue 1 have been implemented as described above. Potential OPGGS Act reforms to address issues 2 to 6 are presented thematically in Table 1. All potential reforms would require legislative amendments.

Identified reforms focus on simplifying the transition pathways from petroleum to CCS, the reuse and repurposing of petroleum assets for CCS projects, measurement, monitoring and verification during CO_2 injection and post injection, and technical and administrative amendments to the OPGGS Act.

Together, these OPGGS Act amendments would ensure the regime appropriately reflects the risks of offshore CCS activities across the project lifecycle. They would also help reduce risks for taxpayers, support transboundary CCS, improve regulatory clarity and simplify processes for CCS proponents.

Table 1: Reform opportunities and pathways

Regulatory reform opportunities have been identified across the 4 main themes as outlined below.

Opportunity	Description	Outcomes
Simplifying transition pathways from petroleum to CCS	• Provisions exist in the OPGGS Act for existing petroleum title holders to transition their activities to pursue dedicated greenhouse gas CCS injection projects without having to go through the competitive acreage release process. • However, CCS titles obtained through this process are restricted, with the CCS title 'tied' to the originating petroleum production title. • Restrictions on injection licences obtained from petroleum titles include: • Source of GHG – some or all of the greenhouse gas substance to be injected must be derived from petroleum recovery operations. • Spatial extent – the storage formation must be wholly situated within the petroleum titleholders existing title area. • Duration – the duration of the greenhouse gas title is dependent on the petroleum title.	• The petroleum to CCS title transition pathway: o enables emissions reduction efforts by petroleum producers o enables petroleum producers to pursue net zero economy business models o supports transboundary movement of CO_2 and establishment of future CCS aggregation hubs and transport infrastructure o aligns with government's net zero and productivity agenda.

Reuse and repurposing of petroleum assets for CCS projects	• Under current OPGGS Act settings, regulatory gaps exist for proponents seeking to repurpose petroleum infrastructure or for its concurrent or sequential use under different titles. • To address this the immediate focus is to develop guidance material to outline steps and expectations for titleholders seeking approval to re-use or repurpose petroleum assets or infrastructure for CCS activities. • However, to resolve the issue with certainty it is suggested that new guidance material be complemented with Act amendments to clarify that maintenance and removal of property is an obligation on the titleholder.	• Potential for improved commercial viability of CCS projects if petroleum production equipment and infrastructure can be re-used for CO_2 storage. • Aligns with government's net zero and productivity agenda.
Measurement, monitoring and verification (MMV) during injection	• MMV settings underpin the collection and provision of information on the operation of CCS projects. • This information is needed, for example, to verify that offshore CCS projects are operating within predicted and agreed parameters during injection phase. • However, under current settings, MMV requirements are largely implicit in nature and there is no clear guidance on expectations around what is acceptable and appropriate during the injection phase of a CCS project. • In addition, there are currently no explicit requirements for the installation of metering	• Provide clear expectations for MMV requirements during injection. • Metering infrastructure requirement will enable accurate emissions reporting and support transboundary CO_2 movement. • Supports potential future introduction of charging or taxation mechanisms. • Will provide baseline data for post-injection monitoring plans.

	infrastructure to collect data on the amount of CO_2 injected and stored. • This gap can be addressed by making metering infrastructure a requirement for undertaking injection activities.	
Post-injection measurement, monitoring and verification (MMV)	• Under current settings, titleholders design and are financially responsible for a program of post-injection MMV activities once injection ceases. This MMV program is then undertaken by government. • However, this approach introduces potential for misaligned incentives and asymmetric information. It also increases financial and operational risks for taxpayers. • Titleholders have the operational and technical capabilities and (with appropriate government oversight) are best placed to undertake post-injection monitoring due to operations experience and data collected throughout the project's life. • Proposed act amendments to ensure titleholders fund and undertake post-injection monitoring.	• Outlines a clear titleholder responsibility to fund and undertake post-injection MMV. • Reduces operational and budget risks for government (e.g., where cost of MMV exceeds available funding). • Strengthens incentives for titleholders to appropriately manage and monitor risks. • Reduces potential information asymmetries between titleholder/operator and regulator. • Consistent with a CCS industry operating at scale. • Consistent with operational capabilities and experience of titleholders.
Technical and administrative OPGGS Act amendments	• Suite of minor technical amendments to the OPGGS Act and the Greenhouse Gas Regulations. • Examples of potential amendments that could be covered under this opportunity include: • aligning decision making for CCS with petroleum where possible	• Improve regulatory efficiency and administration. • Create more efficient and effective decision-making pathways. • Align petroleum and greenhouse gas areas where it makes sense to do so.

	• amending the definition of 'key greenhouse operations' as it is broad and includes activities that may not have a significant adverse impact on petroleum activities (e.g., seismic surveys, sampling and monitoring) • addressing gaps in CCS penalties provisions (e.g., there is a penalty for CO_2 leakage but not for hydrocarbon leaks caused by CO_2 injection).	