CARBON MANAGEMENT TECHNOLOGIES POLICY | *CONSULTATION PAPER*

Australian Energy Producers | 22 December 2025

Australian Energy Producers welcomes the opportunity to provide feedback on the *Carbon Management Technologies Policy* consultation paper.

Reaching net zero is virtually impossible without carbon capture and storage (CCS). CCS plays a unique role among a portfolio of emissions reduction technologies as it can address emissions from existing facilities, including gas and liquified natural gas (LNG) production, and from hard-to-abate industry. CCS also underpins large-scale engineered carbon dioxide removal (CDR) technologies and, combined with natural gas, is the most affordable pathway to low-carbon hydrogen today.

Australia is a global leader in CCS, including hosting two of the largest CO_2 storage projects in the world. The Chevron Gorgon CCS project and the Santos and Beach Energy Moomba CCS project are two of the largest climate-focussed CCS projects operating in the world today, storing up to 1.6 million tonnes of CO_2 (Mt CO_2) and 1.7 Mt CO_2 per year respectively. These projects, along with world-class geological storage resources, a robust and mature regulatory framework, and extensive industry expertise represent a clear comparative advantage for Australia.

Australia's current policy settings do not provide the clarity, consistency or durability required to unlock CCS investment at scale. Inconsistent recognition of CCS across climate, energy and industrial policy settings, regulatory complexity and the exclusion of CCS from key Commonwealth support mechanisms are undermining investment confidence. Failing to adequately recognise the essential role of CCS risks making reaching net zero and maintaining industrial competitiveness in Australia harder and more expensive.

Key recommendations

- **Development of a national CCS strategy** | Developing a national CCS strategy that clearly articulates the role of CCS in emissions reduction and industrial development will raise awareness and help provide long-term confidence for CCS project developers and investors.
- **Provide policy support for CCS** | Ensuring CCS is eligible for support from emissions reductions policies and programs, in particular for hard-to-abate industries, early CCS developers and for the development of shared CO_2 transport and storage infrastructure, will improve investment conditions and help facilitate least-cost pathways to net zero.
- **Streamline project approvals** | Addressing duplication between the Offshore Petroleum and Greenhouse Gas Storage Act and the Sea Dumping Permit regime and finalising the National Action List in a risk-based and fit-for-purpose manner will streamline project approvals.
- **Accelerate bilateral arrangements** | Prioritising bilateral arrangements for cross-border CCS will support economies of scale and position Australia as a regional CCS hub.
- **Provide a clear and consistent government voice on CCS** | Government should clearly and consistently communicate the proven and necessary role of CCS as a means for safe and permanent emissions reduction and actively address misconceptions and misinformation.

Australian Energy Producers looks forward to continuing to support the Department of Climate Change, Energy, the Environment and Water, with Australia's next stage of CCS policy development.

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All credible pathways to net zero require CCS

The International Energy Agency (IEA) is clear that reaching net zero will be "virtually impossible" without CCS.[1] The IEA's Net Zero Emissions scenario requires 1 billion tonnes of CO_2 (Gt CO_2) to be captured annually in 2030, increasing to 6.1 Gt CO_2 in 2050.[2] Similarly, findings from the Net Zero Australia study show CCS to be an integral part of the least-cost pathway to net zero in Australia – no scenario can achieve net zero without CCS. Across the five scenarios in the Net Zero Australia study, the lowest demand for CCS in 2050 is over 80 million tonnes of CO_2 (Mt CO_2) stored per year.[3]

CCS is a proven technology with decades of large-scale operational experience globally. There are more than 77 commercial CCS projects in operation today around the world, which together have the capacity to capture 64 Mt CO_2 per year[4] – equivalent to almost 15 per cent of Australia's annual emissions. The Sleipner project in Norway has been storing up to 1 Mt CO_2 per year, in geology deep below the North Sea, continuously since 1996.[5] Recent years have delivered unprecedented momentum in CCS development globally, with over 650 commercial projects currently under development including 47 under construction.[6]

Australia is among the world leaders in CCS deployment, representing a comparative advantage for Australia. The Chevron Gorgon CCS project[7] in Western Australia and the Santos and Beach Energy Moomba CCS project[8] in South Australia are two of the largest climate-focussed CCS projects operating in the world today. The Chevron Gorgon CCS project is storing 1.6 Mt CO_2 per year today and has stored over 11 Mt CO_2 since 2019 – equivalent to taking more than 3 million passenger vehicles off Australia's roads for a year. The Santos Moomba CCS project commenced operation in 2024, with the capacity to store up to 1.7 Mt CO_2 per year. Australia has a host of CCS projects that aim to start operation in the early 2030s (*see* ***Error! Reference source not found.***).

World-class CO_2 storage resources along with a wealth of CCS skills and experience within the industry give Australia a comparative advantage on the roll-out of CCS. This comparative advantage can deliver large-scale emissions reductions across the Australian economy and the region, while attracting investment in Australia to the benefit of all Australians.

CCS provides Australia with a strategic opportunity to support regional decarbonisation. Many countries in the Asia-Pacific region, including Japan, South Korea and Singapore, have limited domestic geological storage capacity. For these economies, exporting CO_2 for permanent storage will be needed to reduce emissions from existing facilities and hard-to-abate industries. Australia has the opportunity to become a trusted regional storage hub, delivering emissions reductions while generating economic and strategic benefits for the country.

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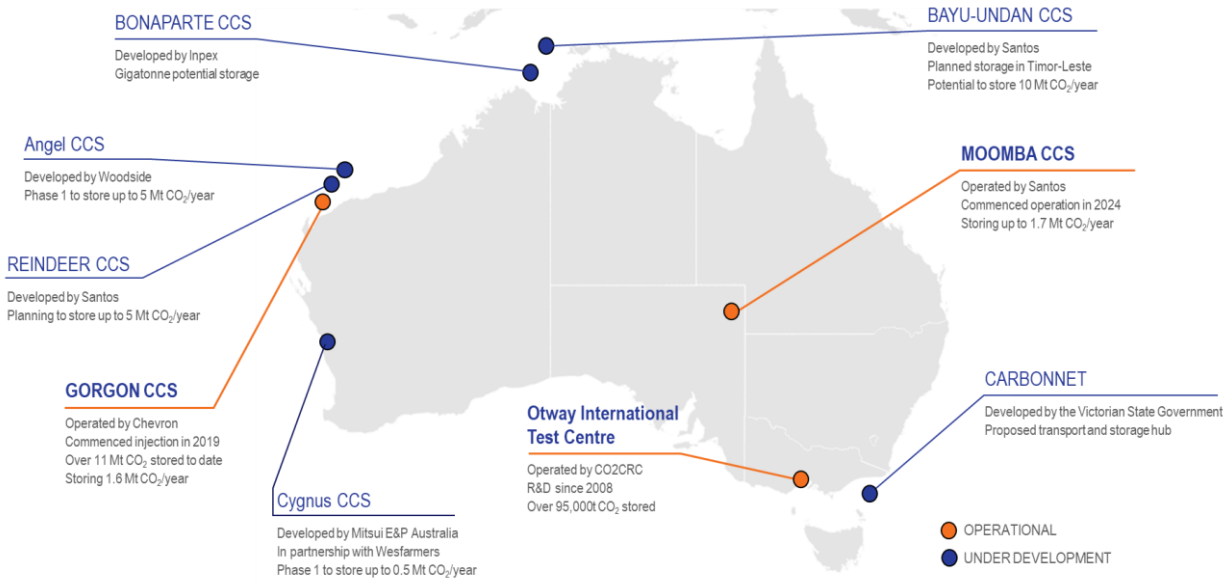
[1] IEA, *Energy Technology Perspectives – Special report on Carbon Capture, Utilisation and Storage*, 2020
[2] IEA, *World Energy Outlook*, 2025
[3] Net Zero Australia, *Final modelling Results*, 2023
[4] Global CCS Institute, *Global Status of CCS 2025*, 2025
[5] Equinor, *CCS: Carbon capture and storage – making net zero possible*, *website* (accessed December 2025)
[6] Global CCS Institute, *Global Status of CCS 2025*, 2025
[7] The Chevron-operated Gorgon Project is a joint venture of Chevron (47.3%), ExxonMobil (25%), Shell (25%), Osaka Gas (1.25%), Tokyo Gas (1%) and JERA (0.417%).
[8] The Santos-operated Moomba Project is a joint venture of Santos (66.6%) and Beach Energy (33.4%).

Figure 1: CCS projects operating and under development in Australia



Question 1: What do you interpret "Carbon Management Technologies (CMT)" to mean and refer to?

a. Do you see any risks or opportunities with using this framing to describe these technologies?

Carbon management technologies (CMT) is a well-established term in international energy and climate policy. The term is commonly used by organisations such as the IEA to describe a suite of technologies that manage CO_2 emissions, including CCS, carbon capture and use (CCU) and CDR. While the terminology may be unfamiliar to many Australians, it can provide a useful framing of the suite of solutions that rely on capturing, transporting and using and/or storing carbon. However, it is important to recognise the

different levels of maturity, operational experience and emissions reduction potential, of various CMTs in policy design and public discourse.

CCS is the most advanced and scalable CMT. CCS is the most mature and scalable element of CMT and is already delivering large-scale, permanent emissions reductions globally. By contrast, deployment opportunities for most CCU remain niche, with applications that are limited in scale and that may or may not result in emissions reductions depending on the end use and lifecycle outcomes. CDR will be critical to managing residual emissions in net zero pathways. However, most engineered CDR options, including bioenergy with CCS (BECCS) and direct air capture with CCS (DACCS), remain expensive and are at an early stage of deployment.

Government can help to improve the awareness and understanding of CMTs and CCS. Clear, authoritative and evidence-based communication from government on the proven nature and

importance of CMTs including CCS, supported by trusted institutions such as CSIRO, will be essential to address misconceptions and support informed public discussion.

Question 2: Which sectors need CCS the most?

a. Where could it have the biggest impact?

b. In what scenarios or conditions would this technology be most needed?

CCS is essential for decarbonising hard-to-abate industrial sectors in Australia. The IEA highlights that CCS is particularly important for hard-to-abate industry where emissions come from the use of fossil fuels to provide high-temperature heat or from chemical reactions, noting CCS can "*tackle emissions in sectors with limited other options, such as cement, steel and chemicals manufacturing, and in the production of synthetic fuels for long-distance transport*."[9] Across these key industries, the IEA also highlight that CCS-based technologies are in many instances the most cost effective option for deep emissions reductions. The IEA finds that CCS "*is currently the cheapest option for reducing emissions in the production of some important chemicals such as ammonia, which is widely used in fertilisers.*" [10] They also highlight that "*in the iron and steel sector, production routes based on CCUS are currently the most advanced and least-cost low-carbon options*." [11] For cement, the IEA state that CCS is "*currently the only scalable solution for reducing emissions*".[12]

While the costs of industrial decarbonisation may vary by country, and on a site-by-site basis, CCS will likely represent the most practical pathway to achieve deep emissions reductions for many Australian industrial facilities. This is supported by the Australian Government's Resources Sector Plan[13] which finds that "*CCS can address industrial and point-source emissions that cannot otherwise be avoided*."

CCS supports the lowest-cost production of low-carbon hydrogen in the near to medium term. According to the IEA nearly 80 per cent of all low carbon hydrogen produced today is produced using CCS.[14] The Australian National Hydrogen Strategy finds that low-carbon hydrogen produced from natural gas with CCS is the lowest-cost pathway to low-carbon hydrogen currently available.[15] As the lowest cost and most advanced pathway to low-carbon hydrogen today, CCS-based hydrogen has a critical role in early market development and to support hard-to-abate end uses that require hydrogen to decarbonise. An exclusive focus on renewable-based hydrogen risks slowing the development of an Australian hydrogen industry.

CCS-based CDR will be required to address residual emissions across the economy. The IEA find that CCS-based CDR, including BECCS and DACCS, will play a significant role in reaching net zero globally. In the 2025 Net Zero Emissions scenario, BECCS and DACCS together deliver over 350 Mt CO_2 abatement per year in 2035, increasing to 1.3 Gt CO_2 per year in 2050. In Australia, CSIRO analysis demonstrates that CCS-based CDR pathways are among the most durable and

[9] IEA, *World Energy Outlook*, 2025
[10] IEA, *Is carbon capture too expensive?*, 2021
[11] Ibid.
[12] Ibid.
[13] Australian Government, *Resources Sector Plan 2025*, September 2025
[14] IEA, *World Energy Outlook*, 2025
[15] Department of Climate Change, Energy, the Environment and Water, National Hydrogen Strategy 2024, 2024

scalable options for achieving negative emissions and managing residual emissions in Australia.[16] Early development of CCS infrastructure and geological storage sites is a prerequisite for the large-scale engineered CDR deployment in Australia.

The role of CCS increases as emissions reduction ambition rises and where the deployment of other technologies is delayed. Net zero modelling consistently shows that higher emissions reductions ambition and increased uncertainty around the pace of renewable deployment, electrification and grid expansion increases reliance on CCS to reach net zero. In the Net Zero Australia analysis,[17] the *Unconstrained Renewable Scenario* requires 80 Mt CO_2 to be stored each year by 2050, compared to nearly 800 Mt CO_2 per year in the *Constrained Renewables Scenario*. Importantly, the Net Zero Australia analysis finds that if both renewables and CCS are constrained, Australia cannot reach net zero.

Importing CO_2 for permanent storage in Australian geology is a key emissions reductions pathway for many countries in the region. For countries with limited CO_2 storage potential such as Japan, South Korea, and Singapore, the export of CO_2 for storage may be the only viable pathway to reduce emissions from existing facilities and from hard-to-abate industry. Australia has the geology, CCS project experience and robust legal and regulatory frameworks necessary to become a key CO_2 storage destination for the region and to take advantage of the economic and emissions reductions opportunities this presents.

Government policy should seek to leverage private sector investment in CCS associated with LNG and gas production as a foundation for broader CCS deployment across the economy. The oil and gas sector is already progressing large-scale CCS projects, supported by established subsurface expertise, project delivery capability and robust regulatory frameworks. Ensuring CCS is eligible for support from emissions reductions policies and programs, in particular to support capture from hard-to-abate industrial facilities and to facilitate shared transport and storage infrastructure, would be a more cost-effective approach than developing stand-alone CCS systems for individual industrial sites in the future.

Question 3: What are the biggest challenges to developing CCS in Australia both in the short and long term?

Lack of policy support remains a key barrier to CCS investment in Australia. While CCS is recognised in some climate and energy policy settings, its role is not consistently reflected across government strategies, modelling assumptions, policies and funding programs. All elements of the CCS supply chain, including emitters, pipeline and shared infrastructure developers, and storage operators continue to be excluded from emissions reductions policies and programs such as the Clean Energy Finance Corporation and the Hydrogen Head Start program. The lack of policy support weakens confidence in the government commitment to CCS and increases perceived risk for capital-intensive projects with long development timeframes. Clearer and more consistent articulation of the role of CCS across climate, energy and industry policy, supported by aligned modelling and guidance, would materially improve investment certainty and accelerate project development. Allowing CCS

[16] CSIRO, *Australian Carbon Dioxide Removal Roadmap*, 2025
[17] Net Zero Australia, *Final modelling Results*, 2023

projects the flexibility to generate Australian Carbon Credit Units would also support the scaling up of this key technology.

Limited public understanding of CCS, combined with persistent misinformation, continues to distort policy and investment debate. Despite decades of safe and regulated operation globally, and two of the largest CCS projects in the world operating in Australia, CCS is frequently mischaracterised as unproven or ineffective, contrary to the assessments of institutions such as the IEA, CSIRO and the Intergovernmental Panel on Climate Change (IPCC). Addressing these misconceptions requires coordinated effort across government, industry and academia, with government playing a particularly important role in providing trusted, authoritative and evidence-based guidance.

Regulatory duplication and unnecessary complexity increase costs and delay CCS deployment. CCS proponents are required to navigate overlapping approval processes which often assess similar risks and impacts. This duplication increases timeframes, raises costs and deters investment without delivering any additional environmental benefit. This is particularly the case with the current Sea Dumping Permit regime which represents significant duplication with approvals under the Offshore Petroleum and Greenhouse Gas Storage Act (OPGGSA) and other permitting processes. In addition, the draft final National Action List continues to be unduly onerous and insufficiently risk-based which may impact the development of offshore CCS projects in Australia.

Advancing CCS bilateral arrangements presents a significant opportunity to accelerate project development and strengthen Australia's role as a regional CCS hub. Large-scale CCS projects under development aim to aggregate CO_2 volumes from multiple domestic and international sources to achieve economies of scale. Establishing timely bilateral agreements with regional partners seeking to export CO_2 to Australia for permanent storage will enhance project viability and unlock Australia's potential as a leader in regional carbon management.

A national CCS strategy would clearly demonstrate the importance of CCS to Australia and help raise awareness of this key technology. Four of the key technology building blocks of emissions reductions and net zero are renewable energy, CCS, low-carbon hydrogen, and natural gas.[18] CCS is now the only one of these key technologies without a national strategy or comprehensive policy framework. The absence of a national CCS strategy creates uncertainty on the Government's stance on the technology, undermining the social licence for CCS in Australia and creating uncertainty among potential project partners and customers in the region.

Question 4: Do Commonwealth policies provide the right environment to support investment in CCS? Why or why not?

Current Commonwealth policy settings do not yet provide a stable or supportive environment for larger-scale and sustained CCS investment. Taken together, existing policy settings combined with the lack of national CCS strategy, risk sending a signal that Australia is not fully committed to enabling CCS. Inconsistent treatment of CCS across policy frameworks, modelling and public communication weakens confidence in long-term government commitment and materially increases investment risk for projects with multi-decade lifespans.

[18] Australian Energy Producers, *A Review of Net Zero Energy and Industrial Zones*, 2023

The exclusion or limited eligibility of CCS across key Commonwealth programs further undermines investment confidence. Major emissions reduction and industry support mechanisms not consistently recognise or support CCS, even where it is required to decarbonise hard-to-abate industries. This weakens the business case for CCS, limits access to finance and discourages early-mover projects.

Regulatory and international policy settings compound these challenges. Duplicative approval processes increase costs and timelines, while slow progress on bilateral arrangements for cross-border CO_2 transport and storage limits the ability of projects to achieve scale. Together, these factors reinforce perceptions that Australia is not yet open for CCS investment.

Outside Australia, CCS receives significant and explicit government support that reflects its critical role in achieving net zero emissions. In the United States, Europe and parts of Asia, governments provide targeted, long-term support for CCS commensurate with its role in achieving net zero, including tax credits, contracts for difference, direct funding and coordinated infrastructure development. These approaches contrast with Australia's fragmented support landscape and risk placing Australia at a competitive disadvantage in attracting CCS investment and associated industrial activity.

Question 5: What is your perspective on current views of CCS - are they generally positive, negative, or mixed and what do you think is driving the views?

Public views of CCS are mixed and shaped by limited awareness, inconsistent messaging and misinformation. Outside industry and technical stakeholders, understanding of CCS remains low. Despite decades of proven operation, CCS is often portrayed as unproven or ineffective in public debate, contrary to the assessments of authoritative institutions such as the IEA, IPCC and CSIRO.

Improving understanding requires coordinated, credible and sustained communication from government and industry. Awareness raising and countering misinformation is most effective when undertaken by a range of independent and credible voices across government, industry and academia. Industry brings operational experience, academia provides independent analysis, and government offers trusted, authoritative guidance.

Clear Government messaging is particularly important in shaping public confidence in CCS. By clearly and consistently communicating the proven and safe nature of CCS, developing a coherent national CCS strategy and reflecting the role of CCS across energy, climate and industrial policies, government can help normalise CCS as a mainstream component of Australia's net zero pathway and support timely deployment at scale.