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10 March 2023

Committee Secretary
Standing Committee on Climate Change, Energy, Environment and Water
PO Box 6021
Canberra ACT 2600

**RE: PARLIAMENTARY INQUIRY: *SUBMISSION TO THE INQUIRY INTO THE AMENDMENTS TO THE LONDON PROTOCOL.***

Please find below the Australian Petroleum Production & Exploration Association's (APPEA) submission to the House of Representatives Standing Committee on Climate Change, Energy, Environment and Water's inquiry into the 2009 and 2013 amendments to the 1996 London Protocol.

**Reaching net zero by 2050 will be "*virtually impossible*" without CCUS.**[1] CCUS is a proven technology with decades of experience globally. CCUS plays a unique role amongst a portfolio of emissions reductions technologies as it can address emissions from existing facilities, mitigate emissions from hard-to-abate industry, support low-carbon hydrogen production and underpin large-scale carbon removal. The International Energy Agency (IEA) Net Zero Emissions (NZE) Scenario requires 1.2 billion tonnes of $CO_2$ to be captured annually in 2030, increasing to 6.2 billion tonnes in 2050.[2] To achieve this "*the NZE Scenario requires more than ten new CCUS equipped facilities to be commissioned each month between* [November 2022] *and 2030*" alongside accelerated deployment of renewable energy, energy efficiency, low-carbon hydrogen and a range of other emissions reductions technologies. The Intergovernmental Panel on Climate Change median scenarios see 17 billion tonnes of $CO_2$ stored per year in 2050.

**The transport of $CO_2$ across international boundaries for permanent storage will play an important role in reducing industrial emissions at scale both in Australia and the region.** The import and export of $CO_2$ is expected to play an important role in meeting net zero targets in our region. Countries such as Japan, South Korea and Singapore have limited $CO_2$ storage potential and are seeking to partner with Australia for storage solutions given our abundant geological $CO_2$ storage resources, industry expertise, and world-leading regulatory frameworks. It can also create efficiencies of scale to facilitate the fast-tracking of emissions reductions from Australian industry. In Europe, similar trading relationships are being established around the North Sea's offshore $CO_2$ storage resources.

**Australia's comprehensive regulatory frameworks for $CO_2$ storage ensure any local environmental risks are identified and mitigated effectively.** Commonwealth and state CCUS legal and regulatory frameworks along with $CO_2$ storage guidelines in the London Protocol and international CCUS standards provide a comprehensive basis for the effective management and mitigation of environmental and other risks associated with $CO_2$ storage. Decades of project experience also underscore that geological storage of $CO_2$ is a safe, proven and effective abatement solution.

APPEA recommends:

- **The Australian government adopt and ratify the London Protocol amendments to allow for the import and export of $CO_2$ for the purposes of CCUS.**
- **The Sea Dumping Act should recognise the strategic importance and existing comprehensive regulations for CCUS and facilitate the efficient and streamlined permitting of CCUS projects.**

APPEA and its members extend the offer to the Standing Committee to provide further detail on CCUS technologies and projects being undertaken in Australia and globally, and look forward to further detailed consultation on the implementation of $CO_2$ import and export in Australia.

[1] IEA, CCUS in Clean Energy Transitions, 2020: https://www.iea.org/reports/ccus-in-clean-energy-transitions
[2] IEA, World Energy Outlook, 2022: https://www.iea.org/reports/world-energy-outlook-2022

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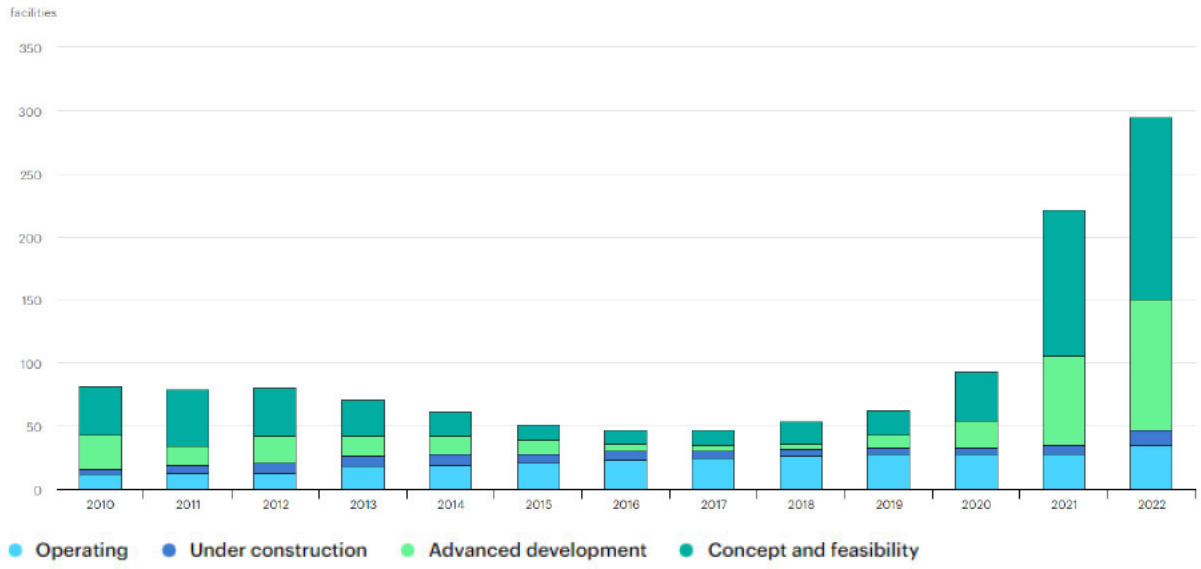
## COMMENTS AND RECOMMENDATIONS

**CCUS is proven technology with over 25 years of experience storing $CO_2$ safely and securely offshore, in the sub-seabed.** There are currently more than 30 commercial CCUS projects in operation today, which together store the equivalent of almost 10 per cent of Australia's emissions annually. The Sleipner project in Norway has been storing 1 million tonnes of $CO_2$ per year, in geology deep below the North Sea, continuously since 1996. Recent years have delivered unprecedented momentum in CCUS development globally, with almost 250 commercial projects currently under development (Figure 1). Almost two-thirds of planned investments are in the United States, Canada and Europe, where governments have recognised the critical role of CCUS and introduced strong policy incentives to fast-track investment. In the United States, this includes a tax credit of USD 85/t for $CO_2$ captured and stored from industrial or power generation facilities.

*Figure 1: CCUS project in operation and under development 2010-2022 (Source: IEA)*




**The Australian oil and gas sector is at the forefront of the deployment of CCUS technologies.** Chevron's Gorgon $CO_2$ Injection Project and Santos and Beach Energy's Moomba CCUS Project (due to be commissioned in 2024) are amongst the largest $CO_2$ storage projects globally. World-class $CO_2$ storage resources along with a wealth of CCUS skills and experience within the industry, give Australia a comparative advantage on the roll-out of CCUS. A comparative advantage that can deliver large-scale emissions reductions across the Australian economy and the region, while attracting investment in the Australian economy.

### *A. The environmental benefits and impacts of exporting and importing $CO_2$ streams for the purpose of sub-seabed sequestration*

**Without the import and export of $CO_2$, countries with limited domestic $CO_2$ storage potential will find meeting emissions reductions targets technically challenging and more expensive.** For countries with limited $CO_2$ storage potential, the export of $CO_2$ for storage in neighbouring countries may be the only viable pathway to reduce emissions from existing facilities and from hard-to-abate industry, such as cement, steel or chemicals production. As with many energy and climate mitigation opportunities, $CO_2$ storage endowments are not evenly distributed around the world. For countries without significant $CO_2$ storage potential, such as Japan, South Korea, Singapore and the Philippines, emissions reductions from existing facilities and from hard-to-abate industry will be a significant challenge if the export of $CO_2$ to countries with large-scale $CO_2$ storage opportunities is not permitted and widely adopted.

**The transboundary transport of $CO_2$ can lead to near-term emissions reductions from Australia projects as well as broader economic benefits.** Santos' proposed Bayu-Undan CCS project proposes capturing $CO_2$, initially from the production and processing of natural gas in Australia and later Australian heavy industry, and transporting it via a repurposed pipeline and injection infrastructure for permanent geological storage in Timor-Leste waters. It is envisaged that this project would have storage capacity of around 10 million tonnes of $CO_2$ each year and would provide significant economic and employment opportunities to both Timor-Leste and Australia. If the export of $CO_2$ from Australia is not permitted, the Bayu-Undan CCS project will not be able to receive Australian emissions. This in-turn will cause significant delays to the decarbonising of large industry in the Northern Territory, with the next potential CCS project in northern Australian waters unlikely to be fully operational until the end of the decade. This delay will result in millions of tonnes of lost emission reductions and will severely impact the ability of these hard-to-abate industries to meet their carbon reduction targets in a cost effective and sustainable way.

**The London Protocol highlights the benefits of sub-seabed storage of $CO_2$ to the oceans while providing guidelines on how local environmental risks can be managed.** As part of the inclusion of sub-seabed $CO_2$ storage under the London Protocol, a *Risk Assessment and Management Framework for $CO_2$ Sequestration in Sub-Seabed Geological Structures*[3] (RAMP) was developed. The RAMP highlights that "*Ocean acidification and other global effects on the marine environment caused by elevated emissions of $CO_2$ are a cause of serious concern*" and that CCUS, which is considered in the London Protocol to be "*technically feasible, using established technologies*" has the "*potential to make a substantial contribution to reducing $CO_2$ emissions to the atmosphere, thus preventing these emissions from being absorbed into the oceans and providing mitigation of ocean $CO_2$, carbonate and pH change, effects on sensitive biological systems and nutrient availability and cycles.*" The RAMP notes that the potential risks posed by CCUS "*are focused primarily at the local scale and include the potential for impacts on the marine environment in proximity to the receiving reservoir*". The RAMP then lays out comprehensive set of guidelines for site selection and characterisation, exposure assessment, effects assessment, risk characterisation, and risk management that mitigate the local risks associated with sub-seabed $CO_2$ storage.

**Comprehensive CCUS legal and regulatory frameworks at Commonwealth and State level in Australia ensure that any risks from storage of $CO_2$ in the sub-seabed are within an acceptable level.** The *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGSA)[4] provides an "*effective regulatory framework for [...] the injection and storage of greenhouse gas substances [...] in offshore areas.*" Further, accompanying regulation such as the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009*[5] ensure that "*greenhouse gas activity carried out in an offshore area is: (a) carried out in a manner consistent with the principles of ecologically sustainable development set out in section 3A of the EPBC Act; and (b) carried out in a manner by which the environmental impacts and risks of the activity will be reduced to as low as reasonably practicable; and (c) carried out in a manner by which the environmental impacts and risks of the activity will be of an acceptable level.*" The OPGGSA applies to all $CO_2$ stored in Commonwealth waters, including $CO_2$ produced domestically as well as imported $CO_2$. The OPGGSA is then complemented by state or territory legal and regulatory frameworks in state or territory waters. As with the storage of domestically sourced $CO_2$, imported $CO_2$ would only be stored in jurisdictions where CCUS legal and regulatory frameworks are in place.

[3] International Maritime Organization, London Protocol Risk Assessment and Management Framework, 2006: https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/CO2SEQUESTRATIONRAMF2006.docb
[4] Offshore Petroleum and Greenhouse Gas Storage Act 2006: https://www.legislation.gov.au/Details/C2022C00175
[5] Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009: https://www.legislation.gov.au/Details/F2023C00107

**The import of $CO_2$ for permanent storage represents an opportunity for Australia to leverage our world-class $CO_2$ storage resources and extensive CCUS experience and capacity to become a regional $CO_2$ storage focal point.** Australia's $CO_2$ storage resources can be made available to help regional partners, such as Japan and Korea, to meet their net zero commitments while presenting a new opportunity for investment in Australia.

### B. *The environmental benefits and impacts of marine geoengineering activity, such as ocean fertilisation, for scientific research*

CCUS is in all ways distinct from marine geoengineering, such as ocean fertilization, and should be excluded from the definition of geoengineering as is the case under the London Protocol.[6] APPEA strongly recommends the two activities be considered separately.

### C. *The international market for $CO_2$ streams*

**There is significant interest in the region for the development of an international export market for $CO_2$ for permanent storage, including from Japan.** A 2022 study by the Global CCS Institute[7] identifies a range of countries in the Asia Pacific region with limited domestic $CO_2$ storage potential that are interested in considering the export of $CO_2$ to other countries in the region for storage. These countries include Japan, South Korea, Singapore and the Philippines. The same study identifies Australia as a potentially important $CO_2$ storage "*anchor nation*", given our excellent storage resources and long history of CCUS development. The report highlights that engagement with industry in Japan and South Korea identified "*that the export of $CO_2$ for storage may be a solution for addressing these nations' significant emissions in the near term.*" [8] Further, the Japanese government's Long-Term CCS Roadmap[9] considers the need for domestically produced $CO_2$ to be transported overseas for storage.

**There is significant ongoing analysis into the market for international movement of $CO_2$ for permanent storage in the Asia Pacific region.** In 2021, an IEA report on CCUS opportunities in Southeast Asia[10] found that *"interest in CCUS in Southeast Asia has been growing"* and that *"at least seven potential projects have been identified and are in early development – in Indonesia, Malaysia, Singapore and Timor-Leste."* The analysis highlighted that "*regional approaches to $CO_2$ transport and storage infrastructure could enable faster and widespread uptake of CCUS in Southeast Asia.*" In addition, there are a range of other ongoing studies looking at the market for $CO_2$ import and export in the Asia Pacific region, including by the International Finance Corporation, the Asian Development Bank, and the Global CCS Institute. A recent McKinsey report[11] highlighted that CCUS holds significant potential for countries in the Asia Pacific region to meet their emissions reduction obligations. According to the report, the region has more than 1,300 emitter companies, over 20 potential carbon removal hubs, and that more than 60 per cent of future CCUS abatement is predicted to come from the region—representing more than 3 billion tonnes of $CO_2$ abatement per year by 2050.

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[6] International Maritime Organization – How Global Regulation Can Deal Responsibly with Climate Change Mitigation Technologies to Protect the Marine Environment, 2019: wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/London%20Protocol%20Climate%20Change%20Leaflet%202019%20_FINAL_online%20version.pdf

[7] Global CCS Institute, Developments and Opportunities – A review of national responses to CCS under the London protocol. 2022: https://www.globalccsinstitute.com/wp-content/uploads/2022/05/Perspective-A-review-of-national-responses-to-CCS-under-the-London-Protocol-Global-CCS-Institute.pdf

[8] Ibid.

[9] Japanese Agency for Natural Resources and Energy, Introduction of Long-Term CCS Roadmap, 2022: https://www.env.go.jp/earth/ccs/3rd_keynote2.pdf

[10] International Energy Agency, Carbon Capture, Utilisation and Storage: The Opportunity in Southeast Asia 2021: https://www.iea.org/reports/carbon-capture-utilisation-and-storage-the-opportunity-in-southeast-asia

[11] McKinsey, Unlocking Asia–Pacific's vast carbon-capture potential, February 2023: https://www.mckinsey.com/industries/oil-and-gas/our-insights/unlocking-asia-pacifics-vast-carbon-capture-potential#/

**The Asia Pacific region can learn from the Northern Lights project in Norway, which is leading the way in the development of international $CO_2$ capture and storage markets.** Norway's Northern Lights project will be the first ever international storage hub for $CO_2$. Once operational, the project plans to receive $CO_2$ captured in neighbouring European countries for permanent storage deep below the North Sea. According to the IEA, the project will play an important role in meeting not just Norway's ambitious climate goals but those of the entire region.[12] When operational, the Northern Lights project will be the first ever cross-border, open-source $CO_2$ transport and storage infrastructure network. Phase one of the project will be completed in 2024 with a capacity of up to 1.5 million tonnes of $CO_2$ per year. Phase 2 will see the project's capacity expand to be able to store a total of 5 million tonnes per year. To facilitate the Northern Lights project and other potential international $CO_2$ storage hubs, in 2019, the parties to the London Protocol supported a Norwegian–Dutch proposition to allow provisional application of this amendment while awaiting ratification by two-thirds of the 53 parties. Countries can make arrangements for the transport of $CO_2$ across national borders by submitting a declaration and bilateral agreement to the International Maritime Organization (IMO).[13]

### *D. The interaction of the proposed amendments with greenhouse gas inventories and regulatory and reporting streams.*

**The treatment of CCUS and cross-border transport of $CO_2$ for the purposes of storage in national inventories is provided for in the Intergovernmental Panel on Climate Change (IPCC) Inventory Guidelines.** Volume 2 of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (2006 GL) provides guidance for accounting of CCUS in national inventories. The IPCC 2006 GL set out detailed, site-specific requirements for $CO_2$ storage, including site characterisation guidance, non-permanence risk assessment and how to quantify any potential leakage. The guidelines are based on detailed monitoring of the $CO_2$ storage site and enshrine the principle that stored $CO_2$ in accordance with the guidelines can be considered as not emitted in national inventories.[14] The IPCC 2006 GL also provide for reporting of cross-border CCUS operations where $CO_2$ is captured in one country and exported for storage in a different country. Under this scenario, the exporting country should report the amount of $CO_2$ captured, any emissions from transport and/or temporary storage that takes place in the exporting country, and the amount of $CO_2$ exported to a second country. The importing country should report the amount of $CO_2$ imported, any emissions from transport and/or temporary storage (that takes place in the importing country), and any emissions from injection and geological storage sites. As with $CO_2$ stored within a single country, provided no $CO_2$ leakage is monitored from the storage site, all stored $CO_2$ would be considered as not emitted in national inventories in the importing country.

**The use of international standards for $CO_2$ transport, storage and monitoring, such as those developed by the International Organization for Standardization (ISO), can support alignment between $CO_2$ importing and exporting countries.** ISO Technical Committee 265, which Australia is a participating member of, has published 12 international standards to date on various aspects of CCUS, including $CO_2$ storage, pipeline transport and monitoring. The use of internationally recognised standards supports greater harmonisation and facilitates agreements between countries considering the import and export of $CO_2$.

[12] CCS Norway, Regulatory Lessons Learned from Longship: https://ccsnorway.com/publication/regulatory-lessons-learned/
[13] Ibid.
[14] IEAGHG, Review of GHG Accounting Rules for CCS, 2016: http://documents.ieaghg.org/index.php/s/YKm6B7zikUpPgGA?path=%2F2016%2FTechnical%20Reviews#pdfviewer

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APPEA and its members are committed to achieving net-zero across the economy by 2050. The oil and gas sector is central to delivering step-change technologies such as CCUS which will be critical across the economy and the region. Ratifying the 2009 and 2013 amendments to the London Protocol is an important step to ensuring the long-term success of Australia and the region in reaching net zero.

APPEA and its members look forward to further consultation on the import and export of $CO_2$ from Australia. Given the growing interest in this area and increasing urgency for emissions reductions in Australia and the region, further consultation on the implementation on the London Protocol 2009 and 2013 is required as a matter of priority, including around details such as $CO_2$ chain of custody, managing liability, and the allocation of risk between parties.

Yours sincerely

[redacted]

Samantha McCulloch

**Chief Executive**

## ANNEX 1: THE AUSTRALIAN UPSTEAM OIL AND GAS INDUSTRY

The Australian oil and gas industry has invested well over $400 billion in the Australian economy undertaking exploration as well as developing natural gas production, transport, liquefaction and export facilities over the last decade. A further $27 billion commitment has been made in the past 18 months.

This investment will deliver returns for Australia for decades to come, through increased gas supply for Australian customers, export revenue, jobs, and in payments to governments in royalties and taxes – nearly $65 billion[15] in payments have been made to government over the last decade.

LNG is now Australia's second largest export commodity after iron ore, with export revenue of more than $70 billion in 2021-22, expected to rise to over $90 billion in 2022-23.[16] As well as providing a significant return to the Australian economy, this LNG export industry is also a key enabler of domestic gas supply.

The oil and gas industry supports 80,000 jobs directly and indirectly in Australia and hundreds of thousands more in manufacturing.

Investment in new gas supply for the east coast market is critical to the ongoing functioning of a stable, reliable electricity market and affordable domestic gas supply. These conditions are vital as the broader energy market transitions through the closure of coal-fired power generators, the construction and grid connection of new renewable projects and the implementation of storage or peaking capacity to firm renewables.[17]

The industry is pivotal to reaching net zero, supporting the transition away from coal, providing the firm dispatchable energy required to unlock our renewable energy potential, and powering Australian industries across the economy. The industry is also central to delivering step-change technologies including carbon capture, utilisation and storage, and low-carbon hydrogen.

**APPEA is the peak national body representing Australia's oil and gas exploration and production industry, accounting for around 95 per cent of the nation's petroleum production.**

APPEA has around 60 full member companies representing oil and gas explorers and producers active in Australia, as well as around 140 associate member companies that provide a wide range of goods and services to the upstream oil and gas industry.

APPEA has for many years supported a national climate change policy that delivers greenhouse gas emissions reductions, consistent with the objectives of the Paris Agreement, and applies a broad-based price signal on emissions to facilitate investment decisions at the lowest cost to the economy. APPEA is committed to working with the Government as it develops policy responses to climate change.

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[15] See Media Release: Oil and gas industry helps bankroll public services despite pandemic challenge | APPEA and Historical-Summary-2019-20.pdf (appea.com.au) for more information. Over and above this, Australia's LNG exporters are set to almost triple their financial contribution to the public this financial year, forecasted to pay an extra $9 billion to federal and state governments. New preliminary forecasts released in October 2022 revealed the gas export sector is estimated to pay around $13 billion during 2022-23 – up from $4.8 billion forecast for last financial year (see Media Release: LNG exporters forecast to pay extra $9 billion to governments as tax and royalty collections almost triple | APPEA for more information).

[16] See Office of the Chief Economist - Resources and Energy Quarterly - September 2022 (industry.gov.au) for more information.

[17] For example, the Australian Energy Market Operator's (AEMO) recent *2022 Integrated System Plan* (available at AEMO | 2022 Integrated System Plan (ISP)) confirmed the long and enduring value of natural gas partnering with renewables with the report finding (page 57): *"Peaking gas-fired generators will play a crucial role as significant coal-fired generation retires, as an on-demand fuel source during extended periods of low VRE output, and to provide power system services for grid security and stability and High renewable output and high demand – gas is needed to meet the demand peaks just after sunset, and to keep going through the night to cover wind variability."* See Media Release: 'Crucial' role for gas powering electricity grid for decades: AEMO report | APPEA for more information.