



Environmental  
Defenders Office

**Submission to the inquiry on the Environment Protection  
(Sea Dumping) Amendment (Using New Technologies to  
Fight Climate Change) Bill 2023**

**6 July 2023**

## **About Environmental Defenders Office**

The Environmental Defenders Office (**EDO**) is a community legal centre specialising in public interest environmental law. We help people who want to protect the environment through law. Our reputation is built on:

**Successful environmental outcomes using the law.** With over 30 years' experience in environmental law, EDO has a proven track record in achieving positive environmental outcomes for the community.

**Broad environmental expertise.** EDO is the acknowledged expert when it comes to the law and how it applies to the environment. We help the community to solve environmental issues by providing legal and scientific advice, community legal education and proposals for better laws.

**Independent and accessible services.** As a non-government and not-for-profit legal centre, our services are provided without fear or favour. Anyone can contact us to get free initial legal advice about an environmental problem, with many of our services targeted at rural and regional communities.

[www.edo.org.au](http://www.edo.org.au)

### **Submitted to:**

Senate Standing Committees on Environment and Communications

Submitted via: [Inquiry Homepage](#)

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## **Acknowledgment of Country**

The EDO recognises First Nations Peoples as the Custodians of the land, seas, and rivers of Australia. We pay our respects to Aboriginal and Torres Strait Islander Elders past, present, and emerging, and aspire to learn from traditional knowledge and customs so that, together, we can protect our environment and cultural heritage through both Western and First Laws. In providing submissions, we pay our respects to First Nations across Australia and recognise that their Countries were never ceded and express our remorse for the deep suffering that has been endured by the First Nations of this country since colonisation.

## Executive Summary

The Environment Protection (Sea Dumping) Amendment (Using New Technologies to Fight Climate Change) Bill 2023 (**the Bill**) was introduced to the House of Representative on 22 June 2023. The Bill has been referred to the Environment and Communications Legislation Committee for inquiry and report by 27 July 2023. Environmental Defenders Office (**EDO**) welcomes the opportunity to comment on the Bill.

This Bill amends the *Environment Protection (Sea Dumping) Act 1981* to allow for the international export of carbon dioxide (**CO<sub>2</sub>**) for the purposes of carbon capture and storage (**CCS**). It also enables permits to be granted for the placement of waste or other matter for a marine geoengineering activity for the purposes of scientific research. While the Bill would be the first step in ratifying new amendments to an international agreement Australia has already signed, the introduction of these changes into domestic legislation do not represent mere technical changes. Both CCS and geoengineering are contested and controversial technologies, and proper scrutiny should be given to the effect and impact of this Bill.

As it stands and for the foreseeable future, CCS does not offer a solution to the enormous contributions of the fossil fuel industry to climate change and may risk the achievement of Australia's international obligations relating to climate change. Additionally, geoengineering raises extensive regulatory, scientific, and ethical questions which have not been adequately resolved at the domestic or international level. Both these policies choices facilitate the continued production and use of fossil fuels, which is incompatible with the action required to ensure a safe climate. **EDO recommends the Federal Government instead focus on ensuring Australia is doing its fair share to ensure a safe climate, and keeping global heating below 1.5C, by phasing out fossil fuels and ensuring a rapid and equitable energy transition**

EDO is of the view that policies such as CCS and geoengineering carry the risk of justifying ongoing use and extraction of fossil fuels, and strongly recommends they should not be promoted or encouraged in order to sustain the life of the fossil fuel industry. CCS in particular also carries significant risk of additional and unintentional emissions pollution in its operation, while the environmental and social risks of large scale geoengineering remain unknown. For these reasons, EDO raises 4 critical issues for the Committee's consideration.

EDO notes the short timeframe for opportunity to comment, and the limited time the Committee has to conduct its inquiry. Given the risks associated with carbon capture and storage and other technologies contemplated by this legislation, **EDO recommends that more time should be provided for assessment and inquiry into the operation of the Bill, and its implications for addressing the climate crisis.**

Our key concerns are identified in this submission and relate to 4 key issues:

- 1. New fossil fuel infrastructure is inconsistent with the Paris Agreement and should not be justified by CCS or geoengineering technologies.**
- 2. CCS does not present a viable mechanism for meaningful reduction of emissions.**
- 3. CCS carries significant risks of GHG leakage from exploration and storage facilities.**
- 4. There are significant environmental risks and impacts in exporting carbon dioxide streams and dumping in Australian waters.**

## Introduction

EDO welcomes the opportunity to provide comments on the Environment Protection (Sea Dumping) Amendment (Using New Technologies to Fight Climate Change) Bill 2023.

EDO's submission on the Bill is couched in the context of its [Roadmap for Climate Reform](#),<sup>1</sup> which recommends reform of Australian climate law to address the climate crisis. EDO advocates for law reform that is science-aligned, prudent, and sufficiently ambitious to meet the scale of the climate crisis.

The IPCC AR6 Report confirms that every tonne of carbon dioxide (CO<sub>2</sub>) emissions adds to global warming, and concludes that limiting human-induced global warming to a specific level requires limiting cumulative CO<sub>2</sub> emissions and reaching at least net zero emissions, including driving strong reductions in other greenhouse gas emissions.<sup>2</sup> The IPCC has also confirmed that to avoid the worst impacts and costs, we need to limit warming of average surface temperatures to no more than 1.5°C above pre-industrial levels.

Crucially, this means climate solutions must address the core drivers of climate change – fossil fuel use, extraction and production. Policies which enable the continued expansion and use of fossil fuels, and subsequent emissions pollution, should be rejected as 'false solutions' which risk undermining global and domestic climate efforts in other sectors.

The Bill implements changes made to the 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (**the London Protocol**) in 2009 and 2013. These relate to the international export of CO<sub>2</sub> for the purposes of carbon capture and storage, and the placement of waste or other matter for the purposes of research into marine geoengineering, respectively.

EDO is of the view that policies such as CCS and geoengineering carry the risk of justifying ongoing use and extraction of fossil fuels, and strongly recommends they should not be promoted or encouraged in order to sustain the life of the fossil fuel industry. CCS in particular also carries significant risk of additional and unintentional emissions pollution in its operation, while the environmental and social risks of large scale geoengineering remain unknown. For these reasons, EDO raises 4 critical issues for the Committee's consideration.

### **1. New fossil fuel infrastructure is inconsistent with the Paris Agreement and should not be justified by CCS or geoengineering technologies.**

Australia is a signatory to the Paris Agreement, which entered into force on 4 November 2016. The Paris Agreement aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty. This is by "holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change".<sup>3</sup>

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<sup>1</sup> Environmental Defenders Office, *A Roadmap for Climate Reform* (2022) <<https://www.edo.org.au/publication/a-roadmap-for-climate-reform/>>.

<sup>2</sup> Hoesung Lee et al., 'Synthesis Report of the IPCC Sixth Assessment Report (AR6)' (2023) IPCC, Figure 3.5, 56, [https://report.ipcc.ch/ar6syr/pdf/IPCC\\_AR6\\_SYR\\_LongerReport.pdf](https://report.ipcc.ch/ar6syr/pdf/IPCC_AR6_SYR_LongerReport.pdf) (**IPCC Sixth Assessment Report**).

<sup>3</sup> Paris Agreement 2015, article 2.

EDO notes the stark differences, in terms of climate change risks and impacts, between a 1.5 °C warming scenario and a 2°C warming scenario were highlighted in the IPCC’s Special Report on the Impacts of Global Warming of 1.5 °C (**SR15**).<sup>4</sup> SR15 states that in order to avoid the most severe impacts of climate change, global temperature increase must be limited to 1.5°C above pre-industrial levels. The IPCC has recently made clear that emissions from existing fossil fuel infrastructure will push the world beyond 1.5°C of warming, and that “[g]lobal warming is more likely than not to reach 1.5°C between 2021 and 2040 even under the very low GHG emission scenarios.”<sup>5</sup> It goes on to say “Pathways consistent with 1.5°C and 2°C carbon budgets imply rapid, deep, and in most cases immediate GHG emission reductions in all sectors (high confidence).”<sup>6</sup>

The International Energy Agency has concluded that the scientifically credible pathway to limiting warming to 1.5°C requires that no new gas and oil fields be approved for development after 2021.<sup>7</sup> The United Nations Secretary-General has warned that “[i]nvesting in new fossil fuel infrastructure is moral and economic madness.”<sup>8</sup>

### **Carbon capture and storage**

Fossil fuels are the main source of GHG emissions, including domestically, and must be rapidly phased out for the world to remain below these critical temperature thresholds.<sup>9</sup> EDO is concerned enabling legislation for CCS will continue to sustain the fossil fuel industry.

Development of CCS activities has been used to justify ongoing fossil fuel extraction, when in reality CCS has not demonstrated a sound basis for, at the scale necessary to respond to climate change, being able to reduce GHG emissions. Legislation enabling CCS further should not proceed while the efficacy of CCS technology in permanently, safely and efficiently storing GHG emissions remains unproven. Any amendments to the Principal Act must proceed from a science-based position, being that fossil fuel activities are to be phased out, and no new gas or petroleum fields should be developed.

Currently the export of controlled material for dumping at sea is prohibited under the *Environment Protection (Sea Dumping) Act 1981 (the Principal Act)*.<sup>10</sup> The Bill will introduce a process for obtaining a permit to export controlled material. Controlled material will include “carbon dioxide streams from carbon dioxide capture processes for sequestration”.<sup>11</sup> It is not clear what are the implications of treating CO<sub>2</sub> as a waste under the Principal Act for other regulatory schemes given that unregulated pollution of CO<sub>2</sub> into the atmosphere is a significant contributor to climate change.

The key control for export of CO<sub>2</sub> streams is that an agreement must be in place with a receiving

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<sup>4</sup> Available at <https://www.ipcc.ch/sr15/chapter/spm/>.

<sup>5</sup> IPCC Sixth Assessment Report, Figure 3.5, 56.

<sup>6</sup> Ibid, 46.

<sup>7</sup> International Energy Agency, ‘Net Zero by 2050: A Roadmap for the Global Energy Sector – Summary for Policymakers’ (May 2021), 11, <[https://iea.blob.core.windows.net/assets/7ebafc81-74ed-412b-9c60-5cc32c8396e4/NetZeroBy2050-ARoadmapfortheGlobalEnergySector-SummaryforPolicyMakers\\_CORR.pdf](https://iea.blob.core.windows.net/assets/7ebafc81-74ed-412b-9c60-5cc32c8396e4/NetZeroBy2050-ARoadmapfortheGlobalEnergySector-SummaryforPolicyMakers_CORR.pdf)>.

<sup>8</sup> UN Secretary-General Antonio Guterres, ‘Secretary-General Warns of Climate Emergency, Calling Intergovernmental Panel’s Report ‘a File of Shame’, While Saying Leaders ‘Are Lying’, Fuelling Flames’ (Media Release SG/SM/21228, 4 April 2022) (2022) United Nations, <<https://press.un.org/en/2022/sgsm21228.doc.htm>>.

<sup>9</sup> See Department of Climate Change, Energy, the Environment and Water, Quarterly Update of Australia’s National Greenhouse Gas Inventory: December 2022.

<sup>10</sup> *Environment Protection (Sea Dumping) Act 1981*, section 10D(1).

<sup>11</sup> Environment Protection (Sea Dumping) Amendment (Using New Technologies to Fight Climate Change) Bill 2023, Part 1, clause 1 and 3.

country that confirms and allocates responsibilities under the London Protocol for a permit to be issued.<sup>12</sup> With an agreement, export can proceed to non-Contracting Parties outside the London Protocol. This is not proportionate risk management for any of the concerns identified in this submission.

At a minimum the agreement should be required to guarantee some environmental safeguards, for instance a requirement that CCS not be used to further extract fossil fuels, as well as equivalent protections as appear in section 19(8A), (9), 21 and 36 the Principal Act should be required.<sup>13</sup> EDO notes that the Minister will have discretion to include further matters in an agreement.<sup>14</sup> This discretion does not resolve concerns around an agreement failing to include requirements to avoid potential leaks and other environmental risks.

Legislation that appears set to facilitate CCS as a result of imported CO<sub>2</sub> in Australia under the scheme of the Principal Act is concerning. It is not clear how this would interact with existing regulation dealing with injection of CO<sub>2</sub> in offshore areas and if equivalent risk management standards would apply for the expanded scheme. In particular, it is not clear how these amendments are intended to interact with the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* and this is not explained in the Explanatory Memorandum.

Section 2 further outlines the risks of Carbon Capture and Storage (**CCS**) contributing further to climate change, rather than mitigating it. The impact of potential GHG emissions from CCS facilitated under this legislation should be considered, in terms of direct emissions from carrying out CCS activities and potential for leaks of injected CO<sub>2</sub>.

### ***Geoengineering and marine fertilisation***

Part 2 of the Bill introduces a new offence in section 10AA of “placing wastes or other matter into Australian waters from any vessel, aircraft or platform” if the placement is for a marine geoengineering activity and is not in accordance with a permit.<sup>15</sup>

The Bill introduces a definition of marine geoengineering activity by reference to the London Protocol.<sup>16</sup> Annex 4 to the London Protocol defines marine geoengineering activity as “deliberate intervention in the marine environment to manipulate natural processes, including to counteract anthropogenic climate change and/or its impacts, and that has the potential to result in deleterious effects, especially where those effects may be widespread, long lasting or severe”.<sup>17</sup> Specifically, activities listed in Annex 4 include ocean fertilization, described as “any activity undertaken by humans with the principal intention of stimulating primary productivity in the oceans...ocean fertilization does not include conventional aquaculture or mariculture or the creation of artificial reefs”.<sup>18</sup> Annex 4 permits ocean fertilization activities only where for

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<sup>12</sup> Environment Protection (Sea Dumping) Amendment (Using New Technologies to Fight Climate Change) Bill 2023, Part 1, clause 3. London Protocol, Article 6(2)(1).

<sup>13</sup> *Environment Protection (Sea Dumping) Act 1981*, section 19(8A), (9), 21 and 36.

<sup>14</sup> *Ibid*, Part 1, clause 3(new section 19(7B)(c)).

<sup>15</sup> Environment Protection (Sea Dumping) Amendment (Using New Technologies to Fight Climate Change) Bill 2023, Part 2, clause 16.

<sup>16</sup> Environment Protection (Sea Dumping) Amendment (Using New Technologies to Fight Climate Change) Bill 2023, Part 2, clause 8.

<sup>17</sup> 2013 Amendment to the 1996 Protocol to the Convention of the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972, to Regulate Marine Geoengineering. Annex, Annex 4.

<sup>18</sup> *Ibid*.

“legitimate scientific research”.<sup>19</sup> The requirements for issuing a permit for placing wastes or other matter into Australian waters are therefore that the placement of wastes or other matter is for scientific research covered by Annex 4 to the Protocol.<sup>20</sup>

The stated intention of these provisions is to give legal certainty to scientific organisations wishing to conduct marine geoengineering research.<sup>21</sup> However, EDO is concerned about the lack of regulatory certainty, both at the domestic and global levels, for the restriction and regulation of geoengineering activity.

As contemplated by Annex 4, geoengineering in the marine environment carries several risks, including the possibility of yet unknown consequences and detrimental effects. As acknowledged when the London Protocol amendment was initially being debated by a Federal Labor Government 2013, ocean fertilisation specifically could also have unintended consequences, such as causing damaging toxic algae blooms, increasing ocean acidification, and depleting oxygen in deep waters.<sup>22</sup> Further, reducing emissions of GHG as rapidly as possible is essential to addressing the climate crisis. Technological fixes, like geoengineering, cannot be used as a justification for slowing the urgent and necessary phase out of fossil fuels.

The Bill does little to address these concerns, instead relying on the Annex 4 provisions to provide limits on the issuing of a permit, alongside a requirement that ‘that pollution of the marine environment from the placement of wastes or other matter for that activity would, as far as practicable, be prevented or reduced to a minimum’.<sup>23</sup> Given marine geoengineering raises issues relating to legal concepts such as transboundary harm, the precautionary principle, and intergenerational justice, this is clearly insufficient to protect the marine environment from harm arising from marine geoengineering projects.

The remainder of this submission deals primarily with CCS.

## **2. CCS does not present a viable mechanism for meaningful reduction of emissions**

EDO submits the Committee should consider whether CCS presents a viable mechanism for meaningful reduction of emissions before recommending further legislation enabling CCS. As it stands, and for the foreseeable future, CCS does not offer an effective abatement solution to the enormous contribution, in the form of various GHG emissions, of the fossil fuel industry to climate change.

The pre- or post-combustion capture of CO<sub>2</sub> requires significant energy use.<sup>24</sup> This energy use could only be countenanced if sourced renewably. But it can reasonably be expected to be sourced from

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<sup>19</sup> Ibid.

<sup>20</sup> Environment Protection (Sea Dumping) Amendment (Using New Technologies to Fight Climate Change) Bill 2023, Schedule 2, clause 35.

<sup>21</sup> Minister for the Environment and Water, Speech, Environment Protection (Sea Dumping) Amendment (Using New Technologies to Fight Climate Change) Bill 2023 Second Reading, Thursday, 22 June 2023.

<sup>22</sup> Tom Arup, The Age, ‘Australia seeks to limit ocean ‘geoengineering’ 16 May 2013 <<https://www.smh.com.au/environment/sustainability/australia-seeks-to-limit-ocean-geoengineering-20130515-2jmkn.html>>.

<sup>23</sup> Environment Protection (Sea Dumping) Amendment (Using New Technologies to Fight Climate Change) Bill 2023, Part 2, clause 35.

<sup>24</sup> Leigh Collins, ‘The amount of energy required by direct air carbon capture proves it is an exercise in futility’, *Recharge* (online, 14 September 2021) (2021, <<https://www.rechargenews.com/energy-transition/the-amount-of-energy-required-by-direct-air-carbon-capture-proves-it-is-an-exercise-in-futility/2-1-1067588>>; see also IPCC, ‘Climate Change 2022: Mitigation of Climate Change, Contribution of Working Group III to the Sixth Assessment Report of the

fossil fuel projects associated with CCS and to increase emissions. Post-combustion capture associated with energy production presents particular difficulties with efficiency and contaminants.<sup>25</sup>

CCS is not currently effective in reducing greenhouse gas emissions and it is unclear whether it will ever be effective, at least in the timescales required to avoid dangerous climate change. CCS is unscalable at the rate and extent needed to see a rapid reduction in emissions.<sup>26</sup> Based on previous real-world experience, it does not present a realistic option for meaningfully reducing CO<sub>2</sub> emissions. According to a report by the Center for International Environmental Law, the “28 CCS facilities currently operating globally have a capacity to capture only 0.1 percent of fossil fuel emissions, or 37 megatons of CO<sub>2</sub> annually.”<sup>27</sup>

The Gorgon LNG project operated by Chevron on Barrow Island in Western Australia demonstrates valid reasons to be concerned about the efficacy of CCS in an Australian context. For that project, the amount expected to be sequestered will be less than 6% of the total emissions from the project (including scope 3 emissions).<sup>28</sup> The low sequestration rates demonstrate the inability of CCS technology to reduce emissions in-line with the commitments of the Paris Agreement.

CCS technologies are not designed to capture and store methane, a much more potent greenhouse gas emitted from oil and gas operations. Methane removal from the air presents technical challenges because “methane is 200 times less abundant in the atmosphere than CO<sub>2</sub>,” and “[c]apturing methane would require processing a lot of air, which would require an unfeasibly large amount of energy.”<sup>29</sup>

Dumping of CO<sub>2</sub> following export (as provided for by Part 1 of the Bill) and within Australian waters may also lead to direct GHG emissions. Depending on the ultimate location for dumping, CCS may be undertaken in geological formations with the potential to release greenhouse gasses during CCS activities.<sup>30</sup>

Facilitating CCS in areas where there are existing offshore oil and gas operations, many of them depleting, may represent an attempt by industry to enhance those fields. Enhanced oil and gas recovery is often coupled with CCS to make the latter technology commercially viable.<sup>31</sup> However, this results in the extraction of additional fossil fuels and GHG emissions, rather than the reduction of GHG emissions, which is the purported purpose of CCS.

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Intergovernmental Panel on Climate Change’ (2022) IPCC, 642  
<[https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC\\_AR6\\_WGIII\\_FullReport.pdf](https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_FullReport.pdf)>.

<sup>25</sup> Ibid. See also Roger Sathre et al., ‘The role of Life Cycle Assessment in identifying and reducing environmental impacts of CCS’ (April 2011), <<https://escholarship.org/uc/item/2bv98328>>.

<sup>26</sup> N. Mac Dowell et al., ‘The role of CO<sub>2</sub> capture and utilization in mitigating climate change’ (2017), 7 *Nature Climate Change*, 243, <<https://www.nature.com/articles/nclimate3231>>.

<sup>27</sup> Ibid, 243.

<sup>28</sup> Chevron, *Gorgon Gas Treatment Plant Greenhouse Gas Management Plan* (17 Aug. 2022), <<https://australia.chevron.com/-/media/australia/our-businesses/documents/gorgon-gas-treatment-plant-greenhouse-gas-management-plan.pdf>>.

<sup>29</sup> Camille Bond, ‘Why Capturing Methane Is So Difficult’, *E&E News* (17 Jan. 2023), <[<sup>30</sup> See for example, Simon Evans, ‘Around the world in 22 carbon capture projects’ \(2014\), Carbon Briefing <<https://www.carbonbrief.org/around-the-world-in-22-carbon-capture-projects/>>. “Captured gas will be injected into a nearby oil field in order to squeeze more oil out of the ground, a technique called enhanced oil recovery.”](https://www.scientificamerican.com/article/why-capturing-methane-is-so-difficult/#:~:text=But%20methane%20is%20200%20times,unfeasibly%20large%20amount%20of%20energy></a>>.</p></div><div data-bbox=)

<sup>31</sup> Ibid.



### **3. CCS carries significant risks of GHG leakage from exploration and storage facilities.**

There are significant concerns around the efficacy of CCS to offset GHG emissions, leaks and fugitive emissions. Recent analysis of the operations of two CCS facilities in Norway shows one site to have been leaking CO<sub>2</sub> for a significant period with the other storing CO<sub>2</sub> below expected storage capacity.<sup>32</sup> The facilities Sleipner and Snøhvit are run by a Norwegian state-owned energy company and have been operating since 1996 and 2008 respectively. The scale of these projects is significant for CCS and they report “an average of 1.8 million metric tonnes per year of CO<sub>2</sub> are disposed of ... accumulating 22 million tonnes in storage so far” for the two sites.<sup>33</sup>

In recent analysis the Sleipner site is reported to have had CO<sub>2</sub> “unpredictably migrating upwards by 220 m” from the original underground storage site.<sup>34</sup> The Snøhvit site faced different challenges. Its storage capacity was revised down from an estimated 18 years of CO<sub>2</sub> sequestration to less than 2 years once the operation was underway.<sup>35</sup>

Leakage of CO<sub>2</sub> emissions has significant climate impacts and can result in vast shortfalls in storage. The significant concerns raised about the efficacy of existing CCS operations, including for those that have been operational for more than a decade, should be considered in Australia in the decision to enable further CCS activities under the Bill as a purported solution to GHG emissions.

### **4. There are significant environmental risks and impacts in exporting and importing carbon dioxide streams, and dumping in Australian waters**

Enabling export of CO<sub>2</sub> risks causing potential significant impact on the environment in other countries, beyond the control of Australia’s regulatory environment. Further enabling CCS activities in Australia, including the import of CO<sub>2</sub>, risks causing potential significant impact on the environment in Australia.

Drilling and laying pipelines in offshore locations may pose significant threats to offshore ecosystems. In the event of leaking carbon dioxide (CO<sub>2</sub>) from CCS activities, the environmental impact on marine environments could be significant. This would be compounded if prolonged leaks occurred or were inadequately monitored and managed. Leaking CO<sub>2</sub> risks causing acidification of the water around the CCS site. CO<sub>2</sub> leakages lead to CO<sub>2</sub> dissolving into seawater and decreasing seawater pH, with the effect of acidifying the marine environment.<sup>36</sup> Acidification can “produce chemical changes in the sediment-seawater interface, leading to biogeochemical alteration in marine ecosystems”.<sup>37</sup>

In experiments mimicking CO<sub>2</sub> leakage in a marine environment, scientists found the CO<sub>2</sub> leakage

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<sup>32</sup> Hauber, G, ‘Norway’s Sleipner and Snøhvit CCS: Industry models or cautionary tales?’, (2023), Institute for Energy Economics and Financial Analysis, < <https://ieefa.org/resources/norways-sleipner-and-snohvit-ccs-industry-models-or-cautionary-tales> >.

<sup>33</sup> Ibid.

<sup>34</sup> Ibid.

<sup>35</sup> Ibid.

<sup>36</sup> MD Basallote et al, ‘Lethal Effects on Different Marine Organisms, Associated with Sediment-Seawater Acidification Deriving from CO<sub>2</sub> Leakage’ (2012) 19(7) *Environmental Science and Pollution Research* 2550, 2551; M Dolores Basallote et al, ‘CO<sub>2</sub> Leakage Simulation: Effects of the PH Decrease on Fertilisation and Larval Development of Paracentrotus Lividus and Sediment Metals Toxicity’ (2018) 34(1) *Chemistry and Ecology* 1, 2.

<sup>37</sup> MD Basallote et al, ‘Lethal Effects on Different Marine Organisms, Associated with Sediment-Seawater Acidification Deriving from CO<sub>2</sub> Leakage’ (2012) 19(7) *Environmental Science and Pollution Research* 2550, 2551.

impacted on species mortality.<sup>38</sup> Scientists have also found CO<sub>2</sub> impacts on species reproduction.<sup>39</sup> A significant impacts on one species is not limited in the harm it causes to that species alone.<sup>40</sup> Separately, research shows that acidic conditions enhance the mobility of trace metals or other contaminants that could be present in marine sediment.<sup>41</sup> This makes trace metals or contaminants more available in the overlaying water column.<sup>42</sup> This may increase risk of environmental harm in marine environments where CCS activities are permitted for dumping, within Australia or in other countries' waters.

The impact of CO<sub>2</sub> leakage on marine wildlife species from expanding CCS activities under the Bill should be considered by the inquiry. The precautionary principle, as set out in section 3A(b) of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) should be considered as a suitable policy guide for this legislation.<sup>43</sup> Potential serious or irreversible damage caused to marine environments in the event of CO<sub>2</sub> leakage may not yet be fully understood in the Australian offshore context, however the impact on specific species in research outlined above raises the question of impact on Australian marine species.

CCS systems are also water-intensive operations because water is needed during the cooling process at the power-plant level and as part of the carbon capture process.<sup>44</sup> Consequently, broad adoption of CCS “could strongly affect local and global water resources” where they compete with municipal and industrial uses, irrigated agriculture, and agro-ecosystems.<sup>45</sup>

Transport of CO<sub>2</sub> for dumping presents significant risks associated with pipeline failure which increase with the distance of travel required.<sup>46</sup> Large-scale implementation of CCS would require “a massive buildout of pipelines and associated infrastructure” on top of the existing oil and gas pipeline network, which would have enormous environmental impacts and endanger the communities through which the pipelines would run.<sup>47</sup>

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<sup>38</sup> M Conradi et al, ‘Lethal and Sublethal Responses in the Clam *Scrobicularia Plana* Exposed to Different CO<sub>2</sub>-Acidic Sediments’ (2016) 151 *Environmental Research* 642, 645; <sup>39</sup> TA Goulding et al, ‘Assessment of the Environmental Impacts of Ocean Acidification (OA) and Carbon Capture and Storage (CCS) Leaks Using the Amphipod *Hyale Youngi*’ (2017) 26(4) *Ecotoxicology* 521, 525, 530–531; <sup>40</sup> Basallote et al, ‘Lethal Effects on Different Marine Organisms, Associated with Sediment-Seawater Acidification Deriving from CO<sub>2</sub> Leakage’ (2012) 19(7) *Environmental Science and Pollution Research* (n 1) 2554–2555.

<sup>39</sup> Basallote et al, ‘CO<sub>2</sub> Leakage Simulation’ (n 46), 8.

<sup>40</sup> Hanna Schade et al, ‘Simulated Leakage of High PCO<sub>2</sub> Water Negatively Impacts Bivalve Dominated Infaunal Communities from the Western Baltic Sea’ (2016) 6 *Scientific Reports* 31447, 2.

<sup>41</sup> MD Basallote et al, ‘Lethal Effects on Different Marine Organisms, Associated with Sediment-Seawater Acidification Deriving from CO<sub>2</sub> Leakage’ (n 46), 2551.

<sup>42</sup> *Ibid.*

<sup>43</sup> *Environment Protection and Biodiversity Conservation Act 1999* (Cth), section 3A.

<sup>44</sup> Lorenzo Rosa et al., ‘The Water Footprint of Carbon Capture and Storage Technologies’ (2021) *Renewable and Sustainable Energy Reviews* 3; see also IPCC AR6 WGIII Report 643 (“CCS requires considerable increases in some resources and chemicals, most notably water. Power plants with CCS could shut down periodically due to water scarcity. In several cases, water withdrawals for CCS are 25–200% higher than plants without CCS (Rosa et al. 2020b; Yang et al. 2020) due to energy penalty and cooling duty. The increase is slightly lower for non-absorption technologies. In regions prone to water scarcity such as the Southwestern USA or Southeast Asia, this may limit deployment and result in power plant shutdowns during the summer months (Liu et al. 2019b; Wang et al. 2019c).”).

<sup>45</sup> *Ibid* 17.

<sup>46</sup> A. Brown et al, ‘IMPACTS: Framework for Risk Assessment of CO<sub>2</sub> Transport and Storage Infrastructure’ (2017) 114 *Energy Procedia* 6501, 6503. See also, Dr. S Jansto, *Risks and Potential Impacts from Carbon Steel Pipelines in Louisiana Transporting and Processing Variable Produced Gases such as CO<sub>2</sub> (CO<sub>2</sub>), Hydrogen (H<sub>2</sub>), Methane (CH<sub>4</sub>)* (Oct. 9, 2022), <[https://healthygulf.org/wp-content/uploads/2022/10/CCS-and-Pipeline-Final-Report\\_Jansto\\_October-9th-1.pdf](https://healthygulf.org/wp-content/uploads/2022/10/CCS-and-Pipeline-Final-Report_Jansto_October-9th-1.pdf)>.

<sup>47</sup> Center for International Environmental Law, ‘Carbon Capture and Storage (CCS): Frequently Asked Questions’ (Blog Post), <<https://www.ciel.org/carbon-capture-and-storage-ccs-frequently-asked-questions/>>. (“CO<sub>2</sub> in high concentrations

The Bill does not contain sufficient safeguards for managing environmental harm caused by CO<sub>2</sub> leakages following export. New subsection 19(7B)(c) to be inserted in the Principal Act requires an agreement to be in place with a receiving country that confirms and allocates responsibilities under the London Protocol for a permit to be issued.<sup>48</sup> It also anticipates agreements with non-Contracting Parties, being jurisdictions that have not made commitments under the London Protocol.<sup>49</sup> The force of the new subsection 19(7B) appears to be that an agreement confirming and allocating responsibility is in place, rather than any guarantee of minimum standards. At a minimum, equivalent protections as appear in the Principal Act for dumping controlled substances should be required.<sup>50</sup>

## Conclusion

The Bill implements amendments made to the London Protocol in 2009 and 2013 into Australian law, relating to CCS and geoengineering. Both CCS and geoengineering are contested policy approaches to addressing climate change and **EDO does not support their implementation in Australia for the reasons detailed above. EDO recommends the Federal Government instead focus on ensuring Australia is doing its fair share to ensure a safe climate, and keeping global heating below 1.5C, by phasing out fossil fuels and ensuring a rapid and equitable energy transition.** Doing so will be safer, faster, and more effective.

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can be hazardous to human health, building out a national CO<sub>2</sub> pipeline network raises safety issues which may affect nearby communities and may hinder CCS deployment.”); see also Congressional Research Service, *CO<sub>2</sub> Pipelines: Safety Issues* (2022), <<https://crsreports.congress.gov/product/pdf/IN/IN11944>>.

<sup>48</sup> Environment Protection (Sea Dumping) Amendment (Using New Technologies to Fight Climate Change) Bill 2023, Part 1, clause 3. London Protocol, Article 6(2)(1).

<sup>49</sup> Environment Protection (Sea Dumping) Amendment (Using New Technologies to Fight Climate Change) Bill 2023, Part 1, clause 3.

<sup>50</sup> See section 19(8A), (9), 21 and 36 of the *Environment Protection (Sea Dumping) Act 1981*.