Curtin University
INSTITUTE FOR ENERGY TRANSITION

24 October 2025

Hon Mr Rhys Williams MLA
Chair, Economics and Industry Standing Committee
Legislative Assembly
Parliament House
West Perth WA 6005

Dear Mr Williams,

Submission: Inquiry into the role of Western Australia in the global effort on decarbonisation

Thank you for the invitation to make a submission. The Curtin Institute for Energy Transition (CIET) welcomes the opportunity to contribute to this important inquiry. Our submission focuses on strategic pathways for Western Australia (WA) to actively participate in the decarbonisation efforts of its major trading partners and to play a pivotal role in their support, particularly countries in the Asia-Pacific region. With abundant natural resources, established energy export infrastructure, emerging renewable energy projects, and strong trade relationships, WA can act as both a transitional and long-term partner in reducing global emissions.

This submission outlines the key pathways, opportunities and barriers relevant to WA's role in enabling decarbonisation for key trading partners. However, it does this in line with consideration of remaining within the Paris Agreement temperature goals of 1.5–2°C[1], and the recognition of the need to transition away from fossil fuel use, (coal, oil and liquefied natural gas [LNG]) without carbon capture and storage (CCS). As highlighted by the Intergovernmental Panel on Climate Change (IPCC) there is a need to transition "to very low- or zero-carbon energy sources including renewables, fossil fuels with CCS, demand-side measures and improving efficiency, reducing non-[carbon dioxide] CO_2 [greenhouse gas] GHG emissions, and [carbon dioxide removal] CDR" [2] (p.21).

Contributors

Professor Peta Ashworth OAM, Professor Klaus Regenauer-Lieb, Dr Eric Lilford, Professor Helen Cabalu, Professor Craig Buckley, Professor Mark Paskevicius, Dr Abebe Hailemariam, Dr Lien Duong, Professor Wahidul Biswas and Dr Alice Evatt (University of Oxford).

Kind regards,

Professor Peta Ashworth OAM
Director, Curtin Institute for Energy Transition
peta.ashworth@curtin.edu.au

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[1] IEA, (2021) Net Zero by 2050: A Roadmap for the Global Energy Sector

[2] IPCC, (2023) Summary for Policymakers In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, pp. 1-34, doi:10.59327/IPCC/AR6-9789291691647.001

Background

In their 2023 report, the Bankwest Curtin Economics Centre (BCEC) identified that WA has substantial advantages in terms of advancing the state's economic complexity and diversification opportunities. To provide data-driven evidence and perspective on WA's position within the decarbonised global economy, BCEC developed a Green Complexity Index (GCI), enabling comparisons of WA's position with other states and countries[3]. The GCI measures the sophistication and diversity of exports in green products that contribute to emissions reduction and climate change mitigation[4]. While WA ranked lowest among Australian jurisdictions in the traditional Economic Complexity Index, it led the nation in the GCI. This contrast underscores the state's potential to transition from resource dependence to a diversified and innovation-based economy. The results demonstrate that WA holds a comparative advantage in green products capability and export readiness, and that the state has a unique potential to attract global investment, develop high-value green industries, develop domestic processing capabilities and drive national prosperity in a decarbonised world.

However, against the European Union's Net Zero Industry Act[5], Japan's Green Transformation Policy[6], India's Production Linked Incentive Scheme[7], and Canada's Growth Fund and Refundable Investment Tax Credits[8] – all designed to stimulate large-scale investment in clean energy technologies and decarbonisation projects – realising this opportunity becomes even more challenging for smaller economies like WA. The concentration of capital, technology, and skilled labour in these leading economies risks diverting global investment flows, potentially undermining Australia's competitiveness, and consequently WA's, in the energy and green manufacturing sectors.

Without comparable policy ambition and targeted support, WA will find it difficult to capture its share of the emerging global green economy. While decarbonisation presents significant opportunities for WA and by default, its key trading partners, these benefits cannot be fully realised without the necessary infrastructure, investment certainty, and policy frameworks that enable the state to compete effectively in the global race for green growth. Ensuring that the right policy settings, infrastructure, and investment frameworks are in place will be essential to fully leverage this strategic advantage.

[3] Buckland et al. (2023) Trading Up: International trade futures and the Western Australian economy. *Bankwest Curtin Economics Centre*. (p.81) https://bcec.edu.au/publications/international-trade-western-australian-economy/

[4] https://www.dfat.gov.au/countries-and-regions/singapore-australia-green-economy-agreement-annexes/annex-b-11-environmental-goods

[5] https://single-market-economy.ec.europa.eu/publications/net-zero-industry-act_en

[6] https://grjapan.com/sites/default/files/content/articles/files/gr_japan_overview_of_gx_plans_january_2023.pdf

[7] https://www.pib.gov.in/PressNoteDetails.aspx?NoteId=155082&ModuleId=3

[8] https://www.canada.ca/en/natural-resources-canada/news/2024/06/government-of-canada-launches-the-first-clean-economy-investment-tax-credits.html

1. Pathways for decarbonisation and WA's contribution

a) LNG exports

Western Australia's potential role in providing energy security for our trading partners is significant. As nations transition from coal-fired power to renewable sources, Australia's LNG serves as a transitional energy source for both Japan and South Korea. However, this energy export model and transition pathway lies in tension with the direction agreed under the United Nations Framework Convention on Climate Change (UNFCCC) process at COP28, which called for a transition away from fossil fuels in energy systems toward low- and zero-emission technologies. Moreover, LNG exports present a challenge for WA's own decarbonisation efforts, given the fact that current LNG facilities in WA are a major contributor to the state's CO_2 emissions[9].

Currently, WA exports most of the CO_2 we produce without accounting for the costs of contained carbon (i.e. no cross-border carbon tax, so our export is without penalty). Tackling this problem is essential to maintaining our reputation as a responsible and innovative energy provider. Adopting a leadership position in addressing this issue will also strengthen WA's position as a competitive and credible energy exporter in a decarbonising global economy, particularly as global markets and investors increasingly favour low-carbon supply chains.

However, in the absence of an economic incentive or disincentive (i.e. carbon trading), there is no reason why, other than through legislation, LNG producers will decarbonise sooner rather than later. This is because retaining the status quo provides the greatest return on investment for producers. Similarly, low-carbon alternative solutions such as carbon capture, utilisation and storage (CCUS) and other carbon dioxide removal (CDR) technologies, deemed critical in many of the International Energy Agency (IEA) and IPCC scenarios to remain below 1.5–2°C [10, 11], are seen as costly and financially risky due to policy uncertainty surrounding the technology.

As the world moves to a net zero target (not absolute zero) and becomes less reliant on fossil fuels (including declining demand for LNG based on current forecasts), this shift will bring additional challenges for WA. These challenges mostly relate to the need for increased minerals and metals required to introduce and activate net zero energy systems. Currently, these extraction and processing activities place further pressure on the requirement to transition away from fossil fuels. This is predominantly due to the need for more grid-connecting materials, the current cost and ability to recycle defunct renewable energy sources (including solar panels, batteries, wind turbine blades), and notably energy storage systems that rely predominantly on batteries, rather than emerging alternatives such as pumped hydro, compressed air, hot salts, hydrogen production from excess power, gravity batteries and more.

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[9] https://unfccc.int/documents/637073 Accessed19th October Downloads/cma2023_16a01E.pdf

[10] IEA, (2021) Net Zero by 2050: A Roadmap for the Global Energy Sector

[11] IPCC, (2023) Summary for Policymakers In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, pp. 1-34, doi:10.59327/IPCC/AR6-9789291691647.001

The transition to net zero, and then to absolute zero, is often portrayed by critics as being prohibitively expensive. However, this perception fails to take into consideration, the cost of climate impacts already being observed in WA, Australia, and the rest of the world. Not to mention, affordability concerns as insurance premiums increase as a result of climate change related weather events[12]. There are equally many who suggest that investing in the green energy transition will likely result in trillions of dollars in net savings. Way et al. (2022) argue that future energy system costs and deployment "will change with time due to innovation, competition, public policy, concerns about climate change, and other factors."[13] CSIRO, in their 2024-25 GenCost report, find that "renewables (solar and wind), backed by storage and transmission, remain the lowest cost new-build electricity generation"[14].

At the cost containment measure fixed price of AUD$80/tonne [$79.20 2024-25] of the Australian Carbon Credit Unit (ACCU) scheme[15], abating scope 1 emissions alone will cost the sector approximately $1.6 billion per year at the current rate. Clearly, this cost cannot be paid in the form of subsidy to the sector as the total revenue of the sector is only $36 billion. Based on internal Curtin researcher calculations, if scope 3 emissions are also included, it would result in the abatement costs rising to about one third of the costs for the whole sector. Thus, to sustain and grow this sector to support our partners to transition to renewable energy, WA will need to accelerate the implementation of CCS and CCU projects that result in permanent storage. However, currently there is only one operating CCS project in WA, and it has not been without its controversies.

There are, however, multiple CCS projects in the pipeline across WA at various stages of development[16]. These include the Angel CCS project, Pilbara CCS pipeline, Cygnus CCS Hub, along with the Mid West Clean Energy project for ammonia export, Reindeer CCS and the Northern Carnarvon Basin CCS. With most of these projects, the focus is primarily on storage and not piloting and deploying large scale carbon capture processes which will be important to bring down the cost of capture.

[12] https://www.apra.gov.au/insurance-climate-vulnerability-assessment

[13] Way, R., Ives, M., Mealy, P. and J. Doyne Farmer (2022) Empirically grounded technology forecasts and the energy transition. *Joule.* V6:9, p2057-2082.

[14] https://www.csiro.au/en/news/all/news/2025/july/2024-25-gencost-final-report

[15] https://cer.gov.au/markets/reports-and-data/quarterly-carbon-market-reports/quarterly-carbon-market-report-september-quarter-2024/australian-carbon-credit-units-accus

[16] https://co2crc.com.au/ccus-and-australias-net-zero-ambitions/

b) Blue and green fuels, such as hydrogen and ammonia

Hydrogen and its derivatives have been identified as representing WA's next frontier in energy exports[17]. With abundant land, high solar irradiation, strong wind resources, and a unique geographic location, WA is well-positioned to emerge as a competitive producer of green hydrogen and ammonia[18]. The proposed offshore renewable energy zone near Bunbury has also been identified as a key enabler for electrolyser-based hydrogen production that can be converted to ammonia for export[19]. By meeting seasonal energy demand, underground hydrogen storage (UHS) also enables vital input for balancing renewable energy intermittency to support large-scale green hydrogen and ammonia production[20]. WA's well-established existing port and shipping infrastructure can be adapted to accommodate large-scale ammonia exports to Asian markets. This demonstrates that green hydrogen has great potential to support WA's decarbonisation efforts and the transition to net-zero emissions both locally and abroad.

However, the slow progress in deploying large scale renewable energy projects, along with the necessary supporting infrastructure (i.e. transmission lines, water) for producing hydrogen and ammonia means WA's competitive advantage is diminishing with each delay. The Pilbara and the Mid West are key areas of focus for hydrogen production in WA, with the Pilbara Energy Transition (PET) Plan[21] being the key vehicle to progress the deployment of energy infrastructure. Unless agreements can be reached with Traditional Owner groups to ensure long-lasting benefits for them, projects delays will continue to happen and diminish this important opportunity for WA.

Despite this, groundbreaking research on exporting hydrogen in the form of a powder (sodium borohydride) is ongoing within the Hydrogen Storage Research Group (HSRG) at Curtin University. Research has demonstrated that costs for this powder are potentially lower than exporting hydrogen in the form of ammonia, liquid hydrogen or liquid organic hydrogen carriers[22]. The Curtin project, funded by the Australian Renewable Energy Agency (ARENA), has hit a milestone where 10g of hydrogen-rich powder (sodium borohydride) has been electrochemically synthesised. The powder has also been tested and released over 10g of hydrogen gas when added to water. The project now aims to hit 100g targets, before developing a pilot plant capable of kilogram-scale production.

Leveraging existing gas infrastructure and geological storage basins, WA can also supply carbon-captured (blue) hydrogen, bridging early demand until renewable energy solutions

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[17] Western Australian (WA) Government, Department of Jobs, Tourism, Science and Innovation, 2024, *Western Australia's Renewable Hydrogen Strategy 2024-2030.*

[18] https://www.irena.org/Energy-Transition/Technology/Hydrogen/Global-hydrogen-trade

[19] Australian Energy Market Operator (AEMO) (2025). 2025 Enhanced Locational Information Report. Melbourne: AEMO. Section 2.1 "National energy policies" p. 14 – listing offshore REZs for Gippsland, Hunter, Southern Ocean, Illawarra, Bass Strait, and Indian Ocean off Bunbury.

[20] Rhee, Y. Jiao, F., Said. Z.S. et al. (2025) Modelling hydrogen storage requirements to balance the future Western Australian grid. *Energy Conversion Management. V346:120426* https://doi.org/10.1016/j.enconman.2025.120426

[21] https://www.wa.gov.au/organisation/energy-policy-wa/pilbara-energy-transition-plan

[22] Ibrahim, A., Paskevicius, M., Buckley, C.E. (2023) Chemical Compression and Transport of Hydrogen using Sodium Borohydride Sustainable Energy & Fuels, 7, 1196-1203. https://doi.org/10.1039/D2SE01334

fully dominate[23]. Researchers at Curtin propose a strategic initiative that directly addresses the CO_2 emissions from LNG facilities while simultaneously kickstarting WA's green fuels industry. This solution serves as a "low-hanging fruit" by filling a critical economic gap in our nascent hydrogen economy – the lack of a large-scale end-user. The proposal is to co-locate renewable hydrogen production plants with existing LNG facilities. The hydrogen and the waste CO_2 (scope 1) from the LNG process would be used to create synfuel (synthetic liquid fuel) both for mining (diesel) and the aviation sector (sustainable aviation fuel [SAF]). This is achieved via Fischer-Tropsch (FT) synthesis, a well-established chemical process that converts a blend of hydrogen and carbon monoxide (known as 'syngas') into liquid hydrocarbons, such as jet fuel[24].

The initiative provides three key benefits. First, it directly converts an industrial waste product (CO_2) into a valuable cleaner energy source. Second, it creates a large, guaranteed end-use for renewable hydrogen, stimulating investment and accelerating the development of the broader hydrogen industry in WA. Finally, it also helps to resolve the national security vulnerability of Australia's current reliance on the US Strategic Petroleum Reserve (SPR) for emergency fuel by providing a locally produced, Australian-owned alternative.

This is particularly relevant for our mining, agriculture and transport sectors who are the largest users of liquid fuels in Australia and among the most difficult to decarbonise. While we have seen a major adoption of rooftop solar PV by households in WA, which in turn is supporting the adoption of electric vehicles as a low-carbon alternative within our cities, the high power and high energy density offered by diesel for heavy industry is currently difficult to replace with electric alternatives.

Although, it is worth noting that while this represents a lower emission pathway, it does not deliver permanent abatement. A McKinsey report[25] suggests there is potential for up to 70% of mobile equipment emissions from mining operations to be mitigated by the adoption of sustainable fuels. In other words, producing liquid fuels from CO_2 and the subsequent adoption of green diesel can help to significantly reduce Australia's carbon emissions. Even a fraction of the potential uptake will position Australia as a leader in adopting new technologies towards a net-zero future. Further expansion globally will increase the social and environmental impact of the implementing CO_2 to fuels technology at LNG facilities. Beyond the environmental impact, the technology has the potential for considerable economic benefit to Australia. Such opportunities help to position WA as a leader in helping our trading partners to decarbonise their heavy industries and transport sectors.

[23] Australian Energy Market Operator (AEMO) (2025) 2025 Enhanced Locational Information Report. Melbourne: AEMO. Section 2.1 "National energy policies"

[24] Joshi, J., Shen,Q. Garg, S. et al. (2024)Techno-economic and Carbon Intensity Analysis of CO2-derived Sustainable Aviation Fuel. https://doi.org/10.21203/rs.3.rs-4948501/v1

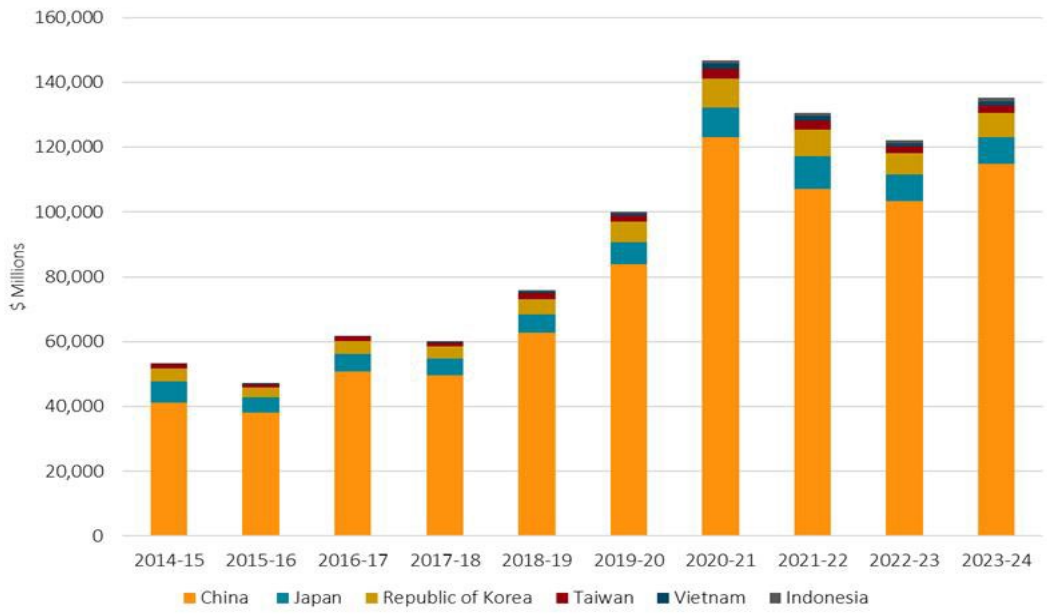
[25] https://www.mckinsey.com/industries/metals-and-mining/ourinsights/creating-the-zero-carbon-mine

c) Green iron

WA is the largest iron ore supplier in the world followed by Brazil[26], with China, India and Russia also producing large amounts which they tend to use only for domestic steel manufacturing. Iron ore represents over 50% of WA's export earnings (in the year to July 2025 it was $114.8 billion[27]), yet downstream processing remains limited. WA's exports of iron ore and concentrates, key inputs for green iron, are predominantly directed towards Asia-Pacific economies (Figure 2), with WA's export profile remaining heavily concentrated in the Chinese market[28]. China accounted for more than 85% of the state's total export value of iron ore and concentrates in 2022–24. Japan remains WA's second-largest export destination, followed by the Republic of South Korea.

Given these strong trade linkages, WA is strategically positioned to play a central role in decarbonisation of our trading partners by piloting green iron demonstration plants that integrate renewable energy with local ore beneficiation and capture more value domestically by moving up the value chain from ore exports to processed green iron. Green iron (hydrogen-based direct reduced iron) is a logical downstream pathway for WA's renewable hydrogen, providing a value-added export that supports both domestic decarbonisation and the emissions goals of trading partners reliant on imported steel [29, 30, 31].

Figure 1: WA's export values of iron ore and concentrates to major trading partners, 2014-15 to 2023-24 ($m)
Source: Adapted from Department of Foreign Affairs and Trade, Trade statistical pivot tables



[26] https://www.watc.wa.gov.au/media/wwtbi5xn/waironoreprofilemay2025.pdf
[27] https://www.watc.wa.gov.au/media/wwtbi5xn/waironoreprofilemay2025.pdf
[28] Western Australian (WA) Government, Department of Jobs, Tourism, Science and Innovation, 2025, WA Iron Ore Profile – May 2025.
[29] Rhee,Y., O'Neill,K. Al Ghafri,S.Z.S et al. (2024) Effect of location on green steel production using Australian resources *International Journal of Hydrogen Energy,* V90: 827-841. https://doi.org/10.1016/j.ijhydene.2024.09.370
[30] Minerals Research Institute of Western Australia (MRIWA), 2023, *Western Australia's Green Steel Opportunity,* MRIWA Project M10471.
[31] Minerals Research Institute of Western Australia (MRIWA), 2025, Green Steel Focus Area Resources. https://www.mriwa.wa.gov.au/minerals-research-advancing-western-australia/focus-areas/green-steel

Similarly, our trading partners are under pressure to decarbonise steelmaking, a sector responsible for about 7% of global CO_2 emissions[32]. Aligning with Japan, South Korea and China's[33] decarbonisation strategies through early partnerships could create long-term export contracts and investment certainty[34]. Green iron, produced using green hydrogen rather than coking coal, presents WA with a chance to move up the value chain, create local jobs, and remain indispensable to trading partners[35].

[32] McKinsey and Company, 2024, Green-steel hubs: A pathway to decarbonize the steel industry, McKinsey Insights.
[33] https://www.pm.gov.au/media/press-conference-shanghai
[34] Ministry of Economy, Trade and Industry (METI) Japan, 2025, *Study Group on Green Steel for Green Transformation,* 23 January 2025. https://www.meti.go.jp/english/press/2025/0123_001.html
[35] TSI (2025) A Green Iron plan for Australia: Securing prosperity in a decarbonising world. https://www.superpowerinstitute.com.au/resource/file-f8963eebb1fe8a9d1e0ae4a15f6c9b994ab7eccc-pdf

d) The importance of carbon capture and storage to the above

Carbon capture and storage remains a contested technology in the public domain. It heavily divides opinions across government, industry and the community[36, 37]. However, the slow progress on mitigating the world's emissions from fossil fuel use, along with the likelihood of gas continuing as a transition fuel until at least 2050 – albeit with declining demand – suggests that CCS remains a critical input of any long-term decarbonisation strategy[38]. This is especially true for hard-to-abate industrial emissions. It also makes it possible to remove legacy CO_2 from the atmosphere (i.e., direct air capture with carbon storage [DACCS] and bioenergy with CCS [BECCS])[39].

Achieving a durable net zero requires that any CO_2 still produced from fossil sources (coal, oil, gas, and limestone) by the mid-century be captured and permanently stored on geological timescales[40]. The point at which a balance is achieved between continued geological CO_2 production and its permanent storage is known as "geological net zero"[41]; meaning, for every tonne of CO_2 still generated from fossil sources, one tonne is permanently stored. In all cost-effective 1.5°C IPCC scenarios that achieve geological net-zero CO_2 emissions by mid-century, gigatonne-scale geological carbon storage (GCS) is deployed[42,43], with estimates ranging from 1–30 $GtCO_2$/year[44] by 2050.

For WA, CCS is important for the decarbonisation of the LNG, blue hydrogen and green iron sectors. LNG and blue hydrogen production both release process CO_2 that must be captured and permanently stored to align with the Paris goals, while green hydrogen and green iron industries can leverage the same geological storage infrastructure to manage residual emissions and support future CDR. CCS is thus critical to all three sectors' ability to remain competitive and credible in a net-zero and decarbonised global market. However, despite the critical importance of geological storage to achieving decarbonisation and achieving net-zero-

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[36] Clulow, Z., M. Ferguson, P. Ashworth, and D. Reiner. 2021. "Comparing public attitudes towards energy technologies in Australia and the UK: The role of political ideology." *Global Environmental Change* 70

[37] Ferguson, M., and P. Ashworth. 2021. "Message framing, environmental behaviour and support for carbon capture and storage in Australia." *Energy Research and Social Science* 73

[38]IPCC, Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (PR Shukla and others eds, Cambridge University Press 2022).

[39] Evatt, A.E.A., Ashworth, P., Jenkins, S. et al. (2025) Escape from the Valley of Death: The Case for a Geological Storage Mandate in Australia. In Blue Sky Issues in the Energy Transition - Special Issue. OGEL Energy Law Journal.

[40] Fankhauser, S., Smith, S. M., Allen, M., Axelsson, K., Hale, T., Hepburn, C., Kendall, J. M., Khosla, R., Lezaun, J., and Mitchell-Larson, E. (2022). The meaning of net zero and how to get it right. Nature Climate Change, 12(1), 15–21.

[41] Allen, M. R., Frame, D. J., Friedlingstein, P., Gillett, N. P., Grassi, G., Gregory, J. M., Hare, W., House, J., Huntingford, C., Jenkins, S., Jones, C. D., Knutti, R., Lowe, J. A., Matthews, H. D., Meinshausen, M., Meinshausen, N., Peters, G. P., Plattner, G.-K., Raper, S., … Zickfeld, K. (2024). Geological Net Zero and the need for disaggregated accounting for carbon sinks. Nature, 1–3. https://doi.org/10.1038/s41586-024-08326-8

[42] Evatt, A. E. A., OAM, P. A., Jenkins, S., Adams, H., Hollestelle, A., Trück, S., Kettlety, T., Wagner, L., Boot, M., and Sundvor, I. U. (2025). Escape from the Valley of Death: The Case for a Geological Storage Mandate in Australia. OGEL Energy Law Journal, 23(3). https://www.ogel.org/article.asp?key=4186

[43] Jenkins, S., Kuijper, M., Helferty, H., Girardin, C., and Allen, M. (2023). Extended producer responsibility for fossil fuels*. Environmental Research Letters, 18(1), 011005. https://doi.org/10.1088/1748-9326/aca4e8

[44] Byers, E., Krey, V., Kriegler, E., Riahi, K., Schaeffer, R., Kikstra, J., Lamboll, R., Nicholls, Z., Sandstad, M., Smith, C., van der Wijst, K., Al -Khourdajie, A., Lecocq, F., Portugal-Pereira, J., Saheb, Y., Stromman, A., Winkler, H., Auer, C., Brutschin, E., … van Vuuren, D. (2022). AR6 Scenarios Database (Version 1.1) [Dataset]. Integrated Assessment Modeling Consortium & International Institute for Applied Systems Analysis. https://doi.org/10.5281/zenodo.7197970

aligned exports, it remains significantly underdeveloped[45]. Both planned capacity and actual deployment needs to be substantially increased over the next three decades if we are to meaningfully contribute to climate mitigation.

It has been suggested that CCS can also support our trading partners in meeting their own emissions reduction targets by providing secure carbon storage services. By implementing transboundary CCS it will be possible to enhance the decarbonisation of the Asia Pacific[46] – the Australian public permitting. It can also position WA as a global leader in integrated decarbonisation hubs that combine CCS with hydrogen, ammonia, and green iron initiatives, aligning with the WA Government's proposed strategic industrial areas.

Scientists at Curtin University are actively researching and developing novel geo-sequestration methods, such as microbubble injections into saline aquifers[47], as well as CCS and CCU[48] technologies more broadly. This research provides a pathway for the permanent storage of CO_2. While this is a more complex undertaking that requires significant legislative and regulatory support, its successful implementation will be crucial for WA to meet its long-term decarbonisation goals. The synfuel proposal and the geo-sequestration research complement each other, offering both a near-term economic solution and a long-term, scalable storage solution.

Curtin University has also recently established a company called Spiropak. The company is developing containerised carbon capture technology using well known industry absorbents. Using this Curtin invention (gas-liquid contactor), Spiropak is able to reduce capture costs by about 25%. In order to have an impact on the reduction in the cost of carbon capture, industry needs to build confidence in such novel technologies. A range of government support mechanisms for piloting these technologies to bring down the costs along with supportive policy frameworks is needed to derisk investment.

[45] Greenfield, C., Budinis, S., and Fajardy, F. (2024). CO2 Transport And Storage—Energy System. International Energy Agency. https://www.iea.org/energy-system/carbon-capture-utilisation-and-storage

[46] DCCEEW (2025) Australia's Net Zero Plan. Commonwealth of Australia

[47] https://co2crc.com.au/ccs-insights-newsletter-july-2025/

[48] Aceituno,D., Zhang, X., and Hao,H. (2025) A comprehensive review on carbon utilization pathways in concrete from conventional to improved strategies. Carbon Capture Science & Technology 16:100467 https://doi.org/10.1016/j.ccst.2025.100467

2. Barriers to investment and opportunities for support

a) Any current barriers to investment in large scale decarbonisation projects and the pathway to green fuels

One primary barrier to investment is that achieving net zero through renewable energy requires careful consideration around land use to avoid sterilisation of preferential agricultural land. This requires a strategic approach from the WA Government working across all regions to develop a blueprint for energy and mining projects[49]. The blueprint must ensure appropriate bottom-up, place-based, co-designed solutions are thoughtfully coordinated with developers, landholders, and Traditional Owners as rightsholders. It would also need to align with the recently released WA whole of system plan for transmission lines[50]. Similarly, there are a number of infrastructure challenges inherent in large scale renewable energy projects, transmission line upgrades, port expansions and accessible water at scale for hydrogen production that will need to be overcome.

A second barrier is achieving a social licence to operate (SLO) and acceptance for the deployment of large-scale projects in local communities[51, 52]. This is particularly so in regional areas where most of the projects will occur. Communities need to see tangible benefits which demonstrate that the transition will not negatively impact their livelihoods and lifestyles. The WA Government's recent consultation on their proposed Community Benefits Guidelines[53] needs to be finalised as a matter of priority. This needs to include not only benefits for wind, solar and storage but also transmission infrastructure. They must also cover projects in both the south and the north west. There is also a need to ensure that First Nations and other local communities will have the opportunity to benefit from projects through equity sharing or other arrangements.

Related to ensuring an SLO, a third barrier is ensuring there is workforce capacity in regional communities. Many towns struggle to attract the workers to keep their businesses operating, let alone fill the jobs that new energy projects will bring. Therefore, there is a need to focus on both reskilling and attracting new workers. Coupled with this is ensuring there is adequate housing available for construction workers in the local towns. Local councils recognise the value these workers can bring to their communities and do not wish to see workers camps that are not integrated into their towns.

Another barrier to investment in large-scale green fuel projects is the uncertainty of end-user demand. The synfuel proposal directly addresses this by creating a massive, dedicated market for renewable hydrogen. This clarity of demand is essential for attracting the necessary private investment for projects to succeed. The Clean Commodities Trading

[49] CIET, 2025 Decarbonise WA, Decarbonise the World Report 2. https://s37430.pcdn.co/ciet/wp-content/uploads/sites/16/2025/06/2025_Decarb-WA-COMPRESSED.pdf

[50] https://www.wa.gov.au/government/document-collections/whole-of-system-plan

[51] Lozano, L. L., B. Bharadwaj, A. de Sales, A. Kambo, and P. Ashworth. 2022. "Societal acceptance of hydrogen for domestic and export applications in Australia." International Journal of Hydrogen Energy 47 (67): 28806-28818.

[52] Clulow, Z., M. Ferguson, P. Ashworth, and D. Reiner. 2021. "Comparing public attitudes towards energy technologies in Australia and the UK: The role of political ideology." Global Environmental Change 70

[53] https://www.wa.gov.au/organisation/energy-policy-wa/community-benefits-guideline-communities-hosting-renewable-energy-projects

Initiative (CCTI) proposed by Thurbon and Yates (2025), is another example of a demand-side intervention, that provides "bankable demand for clean commodities by government creating and accumulating Clean Commodity Credits" [54]. The CCTI provides a simple, relatively low-risk solution by proposing "that government entities enter into offtake contracts to support the early-stage production of new clean commodities such as green pig iron, sustainable aviation fuel (SAF), and green ammonia"[55]. Such an initiative can help to overcome the capital intensity required by first movers with long payback periods and also help WA to compete with the Middle East, North America, and emerging Asian suppliers, many of which offer stronger subsidies for projects.

A fifth barrier is the legislative and regulatory framework required for new and advanced technologies, such as the proposed geo-sequestration methods. The absence of clear legal and commercial frameworks for these technologies creates a risk that hinders private sector investment and creates investor hesitation.

For CCS, the main barrier confronting its successful deployment is the economics associated with projects[56]. Most of these relate to failures of coordination across the CCS value chain, high upfront costs, market failures, perceptions of high investment risks and less than expected volumes of stored CO_2. This means that it remains challenging to scale up. "Within Australia, the Australian Carbon Credit Unit (ACCU) scheme allows entities to earn tradable credits (that can be sold or used for compliance) through approved emissions reductions projects. This works in tandem with the Safeguard Mechanism (SGM) to incentivise emissions reductions. However, since 2023, new CCS projects under the SGM are ineligible to generate ACCUs for reducing their emissions, instead generating Safeguard Mechanism Credits (SMC) when emissions fall below baselines which can be sold or banked"[57].

Evatt et al., (2025) argue that regulatory mandates, when coupled with market-based mechanisms and subsidies, offer an effective pathway to accelerate deployment of CCS and geological storage. However, market-based mechanisms alone have proven insufficient to scale CCS at the pace and volume required, while large-scale subsidies are often difficult to sustain and justify to the public. Mandates, by contrast, can provide the long-term policy certainty and structured investment signal needed to unlock infrastructure development and drive private sector confidence. Mandate mechanisms have previously been used successfully in Australia, such as through the Renewable Energy Target (RET) and WA Domestic Gas Reserve. The success of mandates like the RET was underpinned by clearly defined targets and timelines to provide investment certainty and phased implementation.

Two examples of emerging mandate models for geological carbon storage (GCS) include first, the Injection Capacity Obligation (ICO) (an EU wide target of 50 $MtCO_2$/year CO_2 injection

[54] Thurbon, E. and O, Yates (2025) The case for an Australian Clean Commodities Initiative. https://asiapacific4d.com/idea/ccti/
[55] https://www.greenenergystatecraft.org/ccti-clean-commodities-trading-initiative
[56] Krevor, S. et al. (2023) Subsurface Carbon Dioxide and Hydrogen Storage for a Sustainable Energy Future. *Nature Reviews Earth &* Environment 4:102-118
[57] Evatt, A.E.A., Ashworth, P., Jenkins, S. et al. (2025) Escape from the Valley of Death: The Case for a Geological Storage Mandate in Australia. In Blue Sky Issues in the Energy Transition - Special Issue. OGEL Energy Law Journal.

capacity by 2030) implemented under the EU Net Zero Industry Act[58]. The ICO places mandatory obligations on EU oil and gas companies to provide injection storage capacity based on a pro rata calculation of their share of production in the EU from January 1 2020 to 31 December 2023[59]. The second is the proposed Carbon Takeback Obligation (CTBO) which requires fossil fuel extractors and importers to capture and permanently store a progressively increasing fraction of the CO_2 emissions generated from the fuels they produce[60]. Unlike subsidy payments, these mandates encourage the fossil fuel producers to actively take responsibility for the emissions they produce. Together, these mandate models demonstrate how embedding storage obligations into fossil fuel production frameworks can ensure that responsibility for emissions lies with producers while creating durable, scalable demand for GCS infrastructure – a central condition for achieving geological net zero.

An additional barrier is that WA's ability to provide LNG, blue and green hydrogen, ammonia, and green iron for decarbonisation will depend on the robustness and credibility of lifecycle carbon accounting that tracks embedded emissions from extraction to processing, transport, and end use. Life cycle assessment (LCA) following the ISO14067 guideline will need to be used to develop carbon accounting tools that determine the carbon footprints (i.e., kg CO_2/tonne or m^3 of a commodity) for LNG, blue and green hydrogen, ammonia, and green iron. It will also help to identify the hotspot(s) (carbon intensive processes) to further decarbonise our commodities using cost-effective mitigation strategies. Each LCA is based on the inputs (i.e., energy, materials and transportation) used during the upstream processes of each commodity including LNG[61], CCU fuels, green hydrogen[62, 63] and green steel[64]. This important carbon accounting tool will assist WA comply with the green certification requirements of our trading partners.

LCA is critical, as WA's trading partners develop policies that demand robust measurement, reporting and verification (MRV) frameworks for green certification. For example, the European Union's Carbon Border Adjustment Mechanism (EU's CBAM), is already in its transitional reporting phase and will move to the definitive phase with charges from 1 January 2026. The CBAM requires exporters of iron, steel, aluminium, hydrogen, cement, and fertilisers to account for embedded carbon. Japan's GX-ETS (Green Transformation – Emissions Trading Scheme) is transitioning from a voluntary to compliance-based system from FY2026, with complementary carbon levy settings to be introduced from 2028. Korea's mandatory ETS (K-ETS) with broad sector coverage requires exporters to supply verified

[58] Evatt, A.E.A., Ashworth, P., Jenkins, S. et al. (2025) Escape from the Valley of Death: The Case for a Geological Storage Mandate in Australia. In Blue Sky Issues in the Energy Transition - Special Issue. OGEL Energy Law Journal.
[59] European Commission (2024) The Net-Zero Industry Act: Accelerating the Transition to Climate Neutrality (n 34). https://single-market-economy.ec.europa.eu/industry/sustainability/net-zero-industry-act_en
[60] Jenkins, S., Mitchell-Larson, E., Ives, M.C. et al. (2021) Upstream decarbonization through a carbon takeback obligation: an affordable backstop climate policy. *Joule* 5 2777–96
[61] Biswas, W. K., D. Engelbrecht, and M. Rosano. 2014. "Carbon footprint assessment of Western Australian LNG production and export to the Chinese market." Int. J. Product Lifecycle Management 6 (4): 339-356.
[62] Biswas, W. K., B. C. Thompson, and M. N. Islam. 2013. "Environmental life cycle feasibility assessment of hydrogen as an automotive fuel in Western Australia." International Journal of Hydrogen Energy 38 (1): 246-254.
[63] Hoque, N., W. Biswas, I. Mazhar, and I. Howard. 2020. "Sustainability Implications of Using Hydrogen as an Automotive Fuel in Western Australia." Journal of Energy and Power Technology 2 (3): 1-17.
[64] Ntiamoah, A., Biswas, W., and John, M. (2025). RP3.004 Intermediate Product Exports for Australia- China Green Steel: Assessment of Supply Chain Emissions using Life Cycle Assessment (LCA) Methodology. HILT CRC REPORT 2025-198.

emissions and product-level footprints. China expanded its national ETS in 2025 beyond the power sector to include steel, cement and aluminium, and Vietnam is introducing the pilot stage of its domestic carbon market for the power, iron and steel sectors in late 2025. Carbon accounting tools for WA's commodities are required to address additional barriers including the lack of harmonisation between domestic and international carbon accounting frameworks[65] to prevent uncertainty for both investors and exporters.

For carbon accounting tools, the emissions need to be adequately measured and consistently reported. Current practices rely heavily on self-reported data rather than independent third-party verification which can undermine credibility and trust in export markets[66]. This means that:

- **LNG:** will serve as a transitional fuel only if its full methane and carbon emissions are transparently measured and effectively reduced through credible CCS and methane abatement measures. Trading partners increasingly demand "certified" LNG that adheres to internationally recognised lifecycle accounting standards[67].

- **Blue and green fuels:** WA's hydrogen and ammonia exports must be supported by a credible Australian Guarantee of Origin (GO) scheme and aligned with international certification frameworks to remain competitive. The GO is administered by the Clean Energy Regulator[68] which helps to ensure that emissions intensity claims are reliable and recognised in global markets. The voluntary GO scheme currently includes the Product GO (for hydrogen) and the Renewable Electricity GO (REGO).

- **Green iron:** will be evaluated not only by the production technologies used but also by the verification of its embedded emissions[69]. Clear and transparent accounting of renewable energy inputs, the use of CCS where applicable, and emissions across the entire supply chain will be essential. Product-level transparency of embedded emissions should be supported by ResponsibleSteel certification and international standard ISO14067-compliant product life cycle assessments (LCAs).

- **CCS**: while vital for addressing hard-to-abate industrial emissions, its success depends on transparent performance reporting and supportive policy frameworks. The proposed mandate approaches should be considered to ensure the burden of CCS does not fall to the taxpayer. Experience from the Gorgon CCS project underscores the importance of independent MRV, ensuring producer responsibility, and building community understanding and confidence in the technology[70].

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[65] Downie, J., and W. Stubbs (2013) Evaluation of Australian companies' scope 3 greenhouse gas emissions assessments. *Journal of Cleaner Production* V56: 156-163 https://doi.org/10.1016/j.jclepro.2011.09.010

[66] Li,C., White,L.V., Fazeli, R. et al. (2025) Assessing emission certification schemes for grid-connected hydrogen in Australia. arxiv.org Cornell University. https://arxiv.org/abs/2503.21148

[67] Cenci, S., Biffis, E. (2025) Lack of harmonisation of greenhouse gases reporting standards and the methane emissions gap. *Nature Communi*cations 16,1537 https://doi.org/10.1038/s41467-025-56845-3

[68] https://cer.gov.au/schemes/guarantee-origin

[69] https://assets.wwf.org.au/image/upload/f_pdf/WWF_Green_Steel_Appendix_A_2025

[70] https://ieefa.org/wp-content/uploads/2022/03/Gorgon-Carbon-Capture-and-Storage_The-Sting-in-the-Tail_April-2022.pdf

b) Opportunities for State and Federal support

State and federal government support is crucial for realising decarbonisation opportunities to keep WA competitive with our trading partners. There are a range of opportunities that can be unlocked through strategic actions and interventions by government that will enhance WA's comparative advantage and help to decarbonise our trading partners. These are listed in no priority order as all are deemed important.

First, the Federal Government has acknowledged that acting on climate change is the right thing to do and is now legally committed to reaching net zero by 2050 (Climate Change Act 2022). As well, the energy transition creates an unprecedented economic opportunity that should not be missed. Hence, the Federal Government has adopted a target of 62–70% of emissions reduction below 2005 levels by 2035[71]. Such a global commitment demonstrates Australia is serious about climate change mitigation. If WA wants to be truly recognised as a credible trading partner, it too should be proactive in setting a similar target for 2035, or at least a more proactive renewable energy target for the whole of the state. This will send a strong signal that WA recognises the economic opportunities arising from the energy transition and reducing our emissions.

Second, developing a strong narrative that explains the need to transition to net zero has been mostly absent in WA and Australia. There is a real opportunity for the Government to work with universities and environmental non-government organisations (ENGOs) to engage communities (urban and regional) on the topic and the potential trade-offs between the various solutions for decarbonisation. Adopting a place-based, bottom-up approach will send a strong signal to the Australian public that their input is valued. At the same time, the process will create opportunities to build a cohort of engaged citizens that understand the policy requirements being implemented and become a point of contact into their local communities over time. This can be invaluable to road-test new policy ideas or as new initiatives need to be implemented across different levels of society.

The synfuel proposal within this submission provides a real opportunity for government to reduce emissions and produce green diesel. However, this requires policy support to co-locate hydrogen plants with LNG facilities. This idea fits within the remit of the WA Government and potentially supports the strategic industrial areas (SIA)[72] concept already proposed. This could also stretch to the potential for public-private partnerships and incentives for synfuel production for Australian airlines, and ultimately our trading partners with similar needs.

Building on the concept of public-private partnerships, there is a huge opportunity for both state and federal government to work collaboratively to consider alternative financing mechanisms to support new projects. Currently the risk profile, of many new projects, (whether they are renewable energy generation, new mining, or hydrogen projects), makes it difficult to attract the necessary funding to move projects along. The Capacity Investment Scheme (CIS) financing mechanism has been helpful in identifying a range of prospective

[71] Australia's Net Zero Plan, Department of Climate Change, Energy, the Environment and Water, Canberra, February.
[72] https://www.wa.gov.au/organisation/department-of-energy-and-economic-diversification/western-australias-strategic-industrial-areas

projects while eliminating some of the associated financial risks for them to progress. In addition, consideration around tax incentives, concessional loans, contracts for difference, and production credits all provide practical incentives for projects to get up.

The concept of special economic zones[73] (SEZs) utilises many of these incentives and represent a novel way of enhancing domestic capability while attracting trade and investment. In addition to alternative financing models, incentivisation for new projects can include provision of land, deferred revenue payments, different tax incentives and even the supply of necessary infrastructure. SEZs are very well known and utilised across Asia. The Economic Development Board in Singapore launched them back in the early 1980s and they were quickly followed by Taiwan, Korea and Hong Kong. Then other South-East Asian economies including through the Board of Investment Thailand and the Malaysian Investment Development Authority with their associated economic corridors. These SEZs are consistent with the "Made in WA" plan and the "Future Made in Australia" initiative.

Ongoing investment in energy infrastructure presents an opportunity to unlock both economic benefits for WA and our trading partners, as well as ensure we can achieve the necessary emissions reductions required to stay within the required Paris Aligned temperature goals. This includes ensuring there are enough transmission lines to support an increasing number of renewable energy projects, support for hydrogen hub concepts, port upgrades and potentially new housing infrastructure in regional towns for construction workers. While there are a number of financing mechanisms through federal government support, and to a lesser extent state government, ensuring there are adequate funds directed at the necessary supporting infrastructure remains a critical opportunity.

The establishment of a clear, stable, and supportive regulatory framework for novel geo-sequestration technologies would also help such innovative projects to attract investment and thereby enable their deployment. There is also the possibility to use such a framework to work with the Federal Government to initiate the development of a carbon credit scheme between Japan and Australia, not only for novel CCS technologies but also green hydrogen. This could enable the attraction of additional investment from Japanese companies directly into WA. One possibility is to have (Western) Australia included as a partner country for the Joint Crediting Mechanism (JCM) that is being promoted by the Japanese Ministry of Foreign Affairs[74]. This aligns with the potential for WA to work together with the Federal Government to take the lead on implementing a geological storage mandate as outlined earlier in this submission[75]. Placing active fiscal responsibility on oil and gas producers to take responsibility for their emissions over time would also be complementary to the SGM.

Targeted funding for research and commercialisation of novel R&D approaches such as synfuel, novel advanced geo-sequestration technologies and the export of hydrogen in a powder form, along with other innovative technologies also present unique opportunities for WA. The potential commercial outputs can assist our trading partners in their own

[73] Chaisse, J. and Dimitropoulos, G. (2021) Special Economic Zones in International Economic Law: Towards Unilateral Economic Law. Journal of International Economic Law. 24, 229-257

[74] https://www.mofa.go.jp/ic/ch/page1we_000105.html

[75] Evatt, A.E.A., Ashworth, P., Jenkins, S. et al. (2025) Escape from the Valley of Death: The Case for a Geological Storage Mandate in Australia. In Blue Sky Issues in the Energy Transition - Special Issue. OGEL Energy Law Journal.

decarbonisation efforts and enable the possibility of attracting more funds from both public and private international institutions.

Workforce development and capacity building is also critical. There is an urgent need to begin development of training programs to build a clean energy workforce through both education of a future workforce and reskilling existing workers. Employment opportunities for residents of host communities of energy projects should also be guaranteed through the inclusion of local content requirements in any contracts. In particular, First Nations communities must be included in skill-building initiatives to ensure that they can participate in and benefit from developments on their Country.

Carbon accounting policy opportunities include the need for policy coordination between state and federal governments to avoid duplication. For example, WA's 2024 Greenhouse Gas Emissions Policy for Major Projects aligns with the reformed SGM (effective 1 July 2023). This helps to streamline MRV requirements for SGM covered Scope 1 emissions. Alongside this is the opportunity to collaborate to establish a WA carbon accounting and certification roadmap which will also help our trading partners identify accounting requirements and opportunities. Other collaborative arrangements could include adopting internationally recognised product-level accounting standards (e.g., ISO 14067 Product LCA, Methan MRV), mandating best-practice methane MRV for the gas sector and fast-tracking the Guarantee of Origin (GO) readiness scheme. There is an opportunity to support WA project proponents to become early movers under the GO scheme (Product GO and REGO) through grants for first-of-a-kind verification, data system development, and auditor training.

Other carbon accounting opportunities include to build the MRV framework needed to enable digital measurement, reporting, and assurance (MRA), enhance traceability, and strengthen independent verification capacity to address the skill gap[76]. Additionally, there is the opportunity to pilot an **"**assurance-by-design" approach within WA's SIAs, such as the Kwinana Industrial Area, to integrate carbon accounting, monitoring, and verification into planning and infrastructure development from the outset.

To continue to ensure WA's role as a trusted decarbonisation partner on the global stage, trade and diplomacy considerations are key. Securing offtake agreements with major partners through trade missions and regional agreements will be necessary to ensure guaranteed revenue streams for renewable energy and clean commodity exports. By reducing projects risks in this way, will allow WA to confidently embrace a role as a supplier of low-carbon energy and products.

An additional opportunity is the need to build WA's capability and skills in decommissioning. While companies operating in Australia have been proactive in their production of oil and gas, the end-of-life aspects are creating a range of challenges and opportunities. The Centre of Decommissioning Australia (CODA) estimates the value of the industry to be approximately $60 billion[77]. There is an excellent opportunity for WA to contribute to the decommissioning agenda not only for oil and gas, but also onshore coal fired power stations, like Collie, and

[76] https://www.abc.net.au/news/science/2023-11-03/australian-lawyers-concerned-by-greenwashing-litigation-ban/103049090

[77] A Baseline Assessment of Australia's Offshore Oil and Gas Decommissioning Liability, Executive Summary, ND. CODA

soon renewable energy components such as wind blades, both onshore and offshore. With the number of oil and gas fields in North Western Australia, the Pilbara makes has the potential to be a key hub for decommissioning, where we could develop world-leading skills and capabilities. Developing the skills will be critical, not just for Western Australia's future, but for the potential value add available to offer our neighbouring countries.

Conclusion

There is no doubt that decarbonising the world's energy systems is critical for mitigating climate change. WA has a unique opportunity to play a part in these efforts by transforming its own energy and emissions challenges into economic and technological strengths. Nevertheless, given the dominance of fossil fuels in our energy system it requires strong leadership to move to zero-carbon energy generation while in the process of phasing out fossil fuels. But it is clear that even rapid decarbonisation will still take decades. This means we are at a messy point in the transition where our "fossil-based energy system coexists with a new, zero-carbon energy system. Each imposes operational constraints on the other: what we call the mid-transition"[78]. Given that WA is also at this messy point of the mid-transition it is not surprising the Economics and Industry Standing Committee undertook this *Inquiry into the role of Western Australia in the global effort on decarbonisation.* However, without the rapid deployment of large-scale renewable energy, storage and related energy infrastructure WA's leadership position in global decarbonisation efforts remains tenuous.

This submission has highlighted multiples opportunities for consideration including:

- The need for WA to set an interim target that aligns with the Federal Government's commitment. Without this our leadership position will continue to be questioned by our important trading partners
- To develop a narrative on WA's energy transition and work with universities and ENGOs to engage communities (urban and regional) on the journey. This is particularly important for those living in our regions where the impacts of climate change are being felt
- To take the lead on implementing innovative financing mechanisms including the concept of special economic zones to ensure government does not need to carry the burden of the transition as well as creating opportunities for public-private partnerships
- To invest in the required energy infrastructure to realise reliable renewable energy deployment at scale and capitalise on our unique strengths of wind and solar resources
- Establishment of a clear, stable, and supportive regulatory framework to provide certainty for project proponents including work with the Federal Government to take the lead on implementing a geological storage mandate
- Championing both the immediate, market-driven solution of synfuel production, the long-term, strategic solution of novel advanced geo-sequestration methods, hydrogen powder for export
- Ensuring that our efforts remain Paris Aligned adopting a mandate for geological carbon storage through the phase down period of fossil fuels
- Implementing clear carbon accounting policies that will support WA project proponents to become early movers on the global stage through certification
- Developing the necessary workforce and capability required for the transition

[78] Grubert, E. and Hastings-Simon, S. (2022) Designing the mid-transition: A review of medium-term challenges for coordinated decarbonization in the United States. WIREs Climate Change. https://doi.org/10.1002/wcc.768

Reflecting on these opportunities, in spite of the barriers, WA is at a pivotal time in transforming our energy system and supporting our trading partners to do the same. We know that people and places are deeply enmeshed in system dynamics which makes them highly vulnerable to any shifts in system design. With the energy transition, they can become easily caught up in system-centred political and economic resistance to change. Therefore, to provide confidence and direction for our communities it is important for the WA Government to take a strong leadership position on the energy transition. We need to urgently progress our energy system transformation, so that WA continues to prosper as we move from a carbon intensive energy system to a zero carbon one. These actions are critical for WA to be recognised as a credible partner to do business with and as a lead in decarbonising the world.