The down low on hydrogen policy and regulation in Australia

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Introduction

Hydrogen has been hailed as the fuel of the future. From powering energy intensive industries, such as steelmaking, transport and shipping, to grid electricity, and heating our homes and water, hydrogen is expected to amount to 18% of all global energy consumption by 2050.[1] The development of a domestic hydrogen industry is a key pillar in Australia's plan to reach net zero by 2050. Given its favourable conditions for large scale renewable projects, proximity to major consumer markets in Asia and sophisticated gas export infrastructure, Australia is regarded as a potential major global producer and exporter of hydrogen. However, to attract both domestic and international investment in this emerging industry, Australia requires clear policy and legal frameworks to support hydrogen projects. This article explores the current policy and regulatory landscapes governing the hydrogen industry in Australia and discusses where further legislative reform is needed.

Policy developments

The cornerstone of Australia's hydrogen policy is the Commonwealth Government's National Hydrogen Strategy. While many states have also adopted their own hydrogen strategies, it was agreed as part of the National Hydrogen Strategy that the states would work together with the Commonwealth Government to develop a nationally consistent framework.[2] The National Hydrogen Strategy sets out a vision for a clean, innovative, and safe hydrogen industry, and aims to position Australia as a major global exporter of clean, affordable and high-quality hydrogen by 2030.[3] Five key strategies underpinning the National Hydrogen Strategy are as follows:

Export

While there is likely to be sufficient demand to develop a domestic market for hydrogen in Australia (assuming industry moves towards hydrogen as a partial power source or means of fuelling its transport fleet), the real opportunity for Australia is in its capacity to become a major exporter of hydrogen. A key aim of the National Hydrogen Strategy is for Australia to be one of the top three exporters of hydrogen to Asian markets by 2030.[4] With a small population relative to land mass, producing enough hydrogen to satisfy domestic and export demand is technically feasible, and goes some way to addressing concerns about the future of the existing oil and gas industry in a decarbonised Australia.

To facilitate this objective, Australia has developed ties with Japan, Germany, Singapore, South Korea, the Netherlands and the United Kingdom,[5] and has committed to a range of agreements and co-funded projects with these nations, that vary from technological collaborations, supply chain testing and standards development. Australian states have also entered their own international agreements. For example, the South Australian Government and the Port of Rotterdam Authority have signed a Memorandum of Understanding to study the feasibility of exporting green hydrogen made in South Australia to Rotterdam, Europe's largest port.[6]

A recent study ranked Australia as the fourth most friendly jurisdiction for hydrogen investment in terms of potential returns, project risks and opportunity.[7] Additionally, the fact that shipping distance between ports is a relatively minor component of overall supply chain costs for hydrogen (unlike other exported goods), works in Australia's favour in profiling itself as an economically competitive exporter.[8]

An essential component of an export market will be an internationally recognised certification of origin scheme. Not all hydrogen is created equally; the amount of carbon emitted from the production process varies widely depending on the process adopted. Currently, the most widely utilised hydrogen production methods are steam methane reforming and coal gasification, both of which produce significant amounts of carbon dioxide. Hydrogen produced using these methods is called grey hydrogen. Where the carbon emissions from this process are captured through carbon capture and storage (CCS) technologies, the hydrogen produced is referred to as blue hydrogen. There is, however, a way of producing "renewable" or "green" hydrogen from renewable power sources that does not emit carbon. Electricity generated from renewable sources is used in a process called electrolysis, whereby an electric current splits water into hydrogen and oxygen.

The current cost of producing green hydrogen far outweighs the cost of producing grey or blue hydrogen. However, only green and blue hydrogen have the potential to be either a zero carbon or, in the case of blue hydrogen, a net zero energy source. It will therefore be vital that international consumers can verify the origin of the hydrogen they are purchasing (i.e. whether it was produced using "green" or "blue" methods). In June 2021, the Commonwealth Government sought public submissions on the implementation of an international "Guarantee of Origin" scheme.[9] This would be an internationally recognised and trusted certification given by an independent body that guarantees hydrogen consumers that the product they are purchasing has been developed using renewable energy or carbon capture and storage technology. In December 2021, the Clean Energy Regulator announced that it had commenced trials for a hydrogen Guarantee of Origin scheme, to be developed in partnership with industry and the Department of Industry, Science, Energy and Resources.[10] If Australia formalises this scheme, it will become one of the first jurisdictions to do so (the EU has released the CertifHy regime), and a global leader in low carbon hydrogen certification.

H2 under 2

The Commonwealth Government has set a strong policy goal to reduce the production cost of hydrogen to under $2 a kilogram.[11] This is the price at which hydrogen is expected to become competitive with alternative energy sources in large-scale deployment across Australia. Currently, green hydrogen can be produced for between $6 and $9 per kg.[12] The main hurdles to decreasing the production cost of hydrogen are lowering the cost of electrolysers to approximately $500,000 per megawatt, while increasing their output capacity and efficiency.[13] Another significant cost of producing green hydrogen is the cost of renewable electricity. Further decreases in the costs of solar and wind power will therefore also be needed to achieve the H2 under 2 policy goal.

In addition to technological developments to decrease the cost of hydrogen production, economic incentives (such as subsidies, tax credits and carbon markets) can also be used to lower the cost for producers. The Commonwealth Government has announced that an Emissions Reduction Fund method will be developed in 2022 to allow Australian carbon credit units (ACCUs) to be created from hydrogen projects.[14] These ACCUs can then be sold to the Clean Energy Regulator or on the private market to generate additional income.

A method for crediting abatement from carbon capture and storage projects will also be introduced in 2022, which will support those projects seeking to produce blue hydrogen from natural gas or coal with carbon capture and storage. We have seen significant interest in the market for ACCUs, and through the inclusion of these new methods, there will be a legislated economic incentive for the development of a hydrogen industry. While the Commonwealth Government has made several funding announcements and direct grants available for hydrogen projects,[15] further economic incentives (in addition to ACCUs) are necessary if Australia is to become a competitive exporter of hydrogen in the short term.

Clean hydrogen

There is some debate as to whether Australia's focus should be wholly on green hydrogen, or whether the industry should initially produce a mix of green and blue hydrogen.[16] Australia's former Chief Scientist Dr Alan Finkel (who chaired the working group which developed Australia's National Hydrogen Strategy) has argued that it would be irresponsible not to investigate alternate fuel sources for hydrogen, as multiple sources will provide valuable diversification and opportunities for scale.[17] The Commonwealth Government has indicated that it is technology neutral when it comes to hydrogen production and is not limiting itself to a focus on green hydrogen.[18] This is in contrast to certain European countries, including the Netherlands, Austria, Belgium, Germany, France, Luxembourg and Switzerland, which have signed an agreement to strengthen their cooperation on hydrogen, "with particular emphasis on renewable [green] hydrogen".[19] There is perhaps more incentive for jurisdictions with extensive natural gas and coal reserves, or natural gas and coal supply, to facilitate a blue hydrogen industry, at least in the short term.

Gas blending

The blending of hydrogen in domestic gas networks will be critical to facilitating a domestic hydrogen industry. This has therefore become a key policy focus of both Commonwealth and state governments.[20] A major objective of the National Hydrogen Strategy is for the national gas network to function solely on hydrogen in the future. However, the current demand for hydrogen domestically would not justify the construction of dedicated hydrogen pipelines. For this reason, the focus has been on blending hydrogen into the existing gas network (which appears to be possible at up to 10% by volume without having to modify pipelines or appliances). Given this is a key policy objective, we have seen widespread federal and state funding of projects investigating blending and the capacity to transport hydrogen through existing networks.[21]

Hydrogen hubs

The National Hydrogen Strategy also prioritises the development of clean hydrogen industrial hubs in regional

Australia. These are regions where hydrogen users, producers and exporters are co-located, making the production of hydrogen at scale cheaper and more efficient. In October 2021, the Commonwealth Government opened applications for its Clean Hydrogen Industrial Hubs program which allocates $464 million in grants towards the development of hydrogen hubs across seven priority regional locations nationally.[22]

Legal landscape and areas for reform

There is currently no legal framework in Australia targeted specifically at hydrogen production, transport or use. There are, however, numerous existing regulatory frameworks that would apply to the development of a hydrogen project in Australia. A 2019 review identified 730 pieces of legislation and 119 standards in Australia that may be relevant to a hydrogen industry.[23]

In some areas, existing legal regimes are well-adapted to support hydrogen projects. Others will require reform to facilitate the development and use of hydrogen. The 2021–22 Federal Budget includes $2.4 million to support hydrogen-related legal reforms. While there are a number of relevant legal areas, the following will be of particular importance to developing this new industry.

Intellectual property

The development of hydrogen technologies gives rise to potential intellectual property (IP) risks and opportunities. Compared to the US, China and Japan, Australian companies are applying for and securing fewer IP rights in hydrogen technologies. The most active area of patent filings since 2018 has been "hydrogen storage" with most filings being lodged by foreign applicants. There have been various initiatives to encourage the development of hydrogen technologies in Australia. Proponents need to ensure they have effective strategies in place at the outset of a project to manage IP risks and protect their investments long-term by securing IP rights where possible. The Commonwealth Government is currently considering the introduction of a "patent box" and concessional tax rates for patented low emissions technologies.

Tenure

Another key consideration for hydrogen projects is securing the necessary land tenure. The most appropriate tenure arrangement will vary depending on the location of the project and the existing underlying tenure. Where a project can be located on freehold land, that land can be purchased or leased with easements or licences obtained for any associated infrastructure (e.g. pipelines, transmission lines). However, where a project is proposed on land subject to a pastoral lease or mining tenement, legislative reform will be required to enable the use of the land for commercial scale hydrogen generation as existing regimes do not permit this use under these types of tenure. The Western Australian Government recently announced a new form of non-exclusive tenure for unallocated Crown land and pastoral land to seek to address this issue in Western Australia.[24]

Planning and environmental approvals

Hydrogen infrastructure (for example, production plants, pipelines and storage facilities) will require local or state planning approval. Existing approval pathways, such as the State significant development and infrastructure regimes in NSW, will likely be sufficient to facilitate the development of hydrogen infrastructure. However, states could consider creating new streamlined assessment and approval processes to fast-track hydrogen developments. Hydrogen projects may also require environmental licences and permits due to their environmental impacts, including the use or production of dangerous chemicals such as ammonia.

Additionally, hydrogen projects will require approval under the Environment Protection and Biodiversity Conservation Act 1999 (Cth) if they are likely to have a significant impact on matters of national environmental significance. Recognising the duplication between state and federal environmental approval processes, the Commonwealth Government intends to enter into "approval bilateral agreements" with a number of states to enable a single approval decision to be made that satisfies both state and federal approval requirements.

Water regulation

The production of green hydrogen requires secure, long-term access to large quantities of fresh water. Australian states and territories have complex water licensing regimes that proponents of hydrogen projects will need to navigate. A number of water sources in Australia are also currently overallocated and new water licences are unavailable in some areas, meaning water can only be purchased from existing licence holders. States may consider creating special water entitlements for hydrogen producers, however these would still be dependent on sufficient water being available. Green hydrogen production at-scale in Australia may ultimately require investment in desalination or recycled water treatment plants to meet the considerable water needs of these projects.

Standards

Each stage of the hydrogen project lifecycle requires infrastructure and technology that is yet to be developed on a mass scale. The introduction of new standards is

necessary to ensure the safety of the facilities that produce, store, transport and distribute hydrogen. In July 2020, Standards Australia adopted eight key international hydrogen standards. These include safety standards for the material, design and construction of hydrogen generators (both gas reforming and electrolysis), transportable gas storage devices, land vehicle fuel containers and hydrogen fuelling stations. Some states have begun the process of creating their own standards for the production and use of hydrogen.[25]

Although these standards do not form part of the law, planning laws and instruments often give these standards binding force by requiring that infrastructure be built in accordance with them. Developers should pay close attention to relevant standards and their evolution when designing and building hydrogen infrastructure.

Domestic gas and energy regulation

The national gas regulatory framework does not currently allow for hydrogen blends, biomethane and other renewable gases to be used in the national gas network. Reforms to the national gas regulatory framework are currently proposed to address this.[26] Implementation of these national reforms will not occur until after a public consultation period, and are not anticipated to take effect until 2023. These reforms aim to give legislative and regulatory support to the numerous hydrogen blending projects currently underway across Australia.[27]

Specific hydrogen legislation

South Australia is leading the way in its regulation of hydrogen production. In June 2021, the South Australian Government invited submissions on a proposed bill to expand the scope of the Petroleum and Geothermal Energy Act 2000 (SA) to cover the production of hydrogen.[28] The bill proposes a new Hydrogen Energy Licence, which would authorise the holder to establish and operate a site for the purpose of generating hydrogen for a commercial purpose.[29] This offers a streamlined approvals regime for hydrogen projects, and avoids the need to try to adapt projects to fit existing regulatory regimes for natural gas or petroleum that are not suited to the unique demands of hydrogen production.

While taking a slightly different approach to the South Australian model, NSW has recently proposed several amendments to its energy legislation to encourage hydrogen production and use in NSW. The Energy Legislation Amendment Bill 2021 (NSW) seeks to implement a number of legislative changes, including allowing the definition of natural gas to be prescribed by regulation (so that it can be amended to include hydrogen), simplifying the hydrogen production licensing process, and exempting electricity used in electrolysis from additional costs and system charges.[30]

Conclusion

Hydrogen represents a significant opportunity for Australia. However, both Commonwealth and State Governments must continue to support the growth of a hydrogen industry through clear policy positions and financial incentives, and expedite legal reforms to provide fit for purpose legal frameworks for the development, transport and use of hydrogen at a commercial scale. Without such support, Australia risks losing its natural advantage in the global hydrogen race.

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Footnotes

1. Hydrogen Council, Hydrogen Scaling Up: A sustainable pathway for the global energy transition, November 2017, accessed 16 November 2021, p 8, https://hydrogencouncil.com/wp-content/uploads/2017/11/Hydrogen-scaling-up-Hydrogen-Council.pdf.
2. COAG Energy Council, *Australia's National Hydrogen Strategy*, November 2019, accessed 11 November 2021, p 50, www.industry.gov.au/sites/default/files/2019-11/australias-national-hydrogen-strategy.pdf (*National Hydrogen Strategy*).
3. National Hydrogen Strategy above n 2, at pp 70–71.
4. National Hydrogen Strategy, above n 2, at p 71.
5. Department of Industry, Science, Energy and Resources, Office of the Special Adviser to the Australian Government on Low Emissions Technology, accessed 11 November 2011, www.industry.gov.au/policies-and-initiatives/office-of-the-special-adviser-to-the-australian-government-on-low-emissions-technology.

6. Dan van Holst Pellekaan MP and Stephen Patterson MP, "Feasibility study on export of SA green hydrogen to Rotterdam", Media Release, 23 March 2021, accessed 15 November 2011, at www.premier.sa.gov.au/news/media-releases/news/feasibility-study-on-export-of-south-australian-green-hydrogen-to-rotterdam.
7. Cranmore Partners and Energy Estate, *H2i Hydrogen Investability Index: Emerging Hydrogen Superpowers*, October 2021, p 4, accessed 10 January 2022 at www.h2-index.com.
8. A Taylor, "Strong potential for future Australia-Germany hydrogen exports", Media Release, 29 October 2021, accessed 11 November 2021, at www.minister.industry.gov.au/ministers/taylor/media-releases/strong-potential-future-australia-germany-hydrogen-exports.
9. Department of Industry, Science, Energy and Resources, "Hydrogen Guarantee of Origin scheme: have your say", 21 June 2021, accessed 11 November 2011 at www.industry.gov.au/news/hydrogen-guarantee-of-origin-scheme-have-your-say.
10. Clean Energy Regulator, "Hydrogen certification trial sets the stage for burgeoning industry" 10 December 2021, accessed 17 January 2022, www.cleanenergyregulator.gov.au/ERF/Pages/News%20and%20updates/News-item.aspx?ListId=19b4efbb-6f5d-4637-94c4-121c1f96fcfe&ItemId=1029.
11. A Taylor, "Fast tracking renewable hydrogen projects", Media Release, 15 April 2020, accessed 11 November 2021 at www.minister.industry.gov.au/ministers/taylor/media-releases/fast-tracking-renewable-hydrogen-projects.
12. ARENA, "Australia's pathway to $2 per kg hydrogen", 30 November 2020, accessed 11 November 2021, https://arena.gov.au/blog/australias-pathway-to-2-per-kg-hydrogen/.
13. Above.
14. A Taylor MP, "New ERF method and 2022 priorities announced", Media Release, 1 October 2021, accessed 15 November 2021 at www.minister.industry.gov.au/ministers/taylor/media-releases/new-erf-method-and-2022-priorities-announced.
15. Department of Industry, Science, Energy and Resources, "Funding Available for Clean Hydrogen Industrial Hubs", 22 September 2021, accessed 27 October 2021 at www.industry.gov.au/news/funding-available-for-clean-hydrogen-industrial-hubs (*Hydrogen Hubs*).
16. J Mathews, "Australia's clean hydrogen revolution is a path to prosperity — but it must be powered by renewable energy", *The Conversation* 27 October 2021, accessed 11 November 2021 at https://theconversation.com/australias-clean-hydrogen-revolution-is-a-path-to-prosperity-but-it-must-be-powered-by-renewable-energy-169832.
17. M Foley, "Keep an open mind on fossil fuelled hydrogen, Chief Scientist says", *Sydney Morning Herald,* 6 May 2020, accessed 19 November 2021 at www.smh.com.au/politics/federal/keep-an-open-mind-on-fossil-fuelled-hydrogen-chief-scientist-says-20200505-p54q38.html.
18. Commonwealth of Australia, Budget Measures, Budget Paper No. 2 2020–21, 6 October 2020, p 119, https://archive.budget.gov.au/2020-21/bp2/download/bp2_complete.pdf; A Taylor, "Government gets on with the job of supporting the next generation of low emissions technologies", 4 August 2021, accessed 13 January 2022 at www.minister.industry.gov.au/ministers/taylor/media-releases/government-gets-job-supporting-next-generation-low-emissions-technologies.
19. Pentalateral Energy Forum, "Joint Political Declaration of the Pentalateral Energy Forum on the role of Hydrogen to Decarbonise the Energy System in Europe", 11 May 2020, accessed 15 November 2021, www.bmwi.de/Redaktion/DE/Downloads/P-R/penta-declaration-signed.pdf?__blob=publicationFile&v=4.
20. The NSW and WA Governments both aim to achieve 10% renewable hydrogen in the gas network by 2030. See NSW Department of Planning, Industry and Environment, *NSW Hydrogen Strategy*, October 2021, accessed 16 November 2021, p 40, www.energy.nsw.gov.au/renewables/renewable-generation/hydrogen; and WA Department of Jobs, Tourism, Science and Innovation, *Western Australian Renewable Hydrogen Roadmap*, November 2020, accessed 16 November 2021, p 15, www.wa.gov.au/government/publications/western-australian-renewable-hydrogen-strategy-and-roadmap.
21. A MacTiernan MLC, "$2 million boost to kickstart hydrogen gas blending", Media Release, 18 August 2021, accessed 15 November 2021, www.mediastatements.wa.gov.au/Pages/McGowan/2021/08/2-million-dollar-boost-to-kickstart-hydrogen-gas-blending.aspx (*WA Blending)*; Australian Gas Infrastructure Group, "Hydrogen Park South Australia", accessed 15 November 2021 at www.agig.com.au/hydrogen-park-south-australia (*SA Hydrogen-Park*); Australian Gas Infrastructure Group and Engie, "Hydrogen Park Murray Valley", accessed 15 November 2021, www.agig.com.au/hydrogen-park-murray-valley.
22. Hydrogen Hubs, above n 15.
23. Clayton Utz, "Hydrogen Industry Legislation", November 2019, p 7, accessed 16 November 2021, at www.industry.gov.au/sites/default/files/2021-09/nhs-hydrogen-industry-legislation-report-2019.pdf.
24. T Buti, "State Government to unlock land for renewable energy and economic diversification", Media Release, 18 November 2021, accessed 18 November 2021 at www.mediastatements.wa.gov.au/Pages/McGowan/2021/11/State-Government-to-unlock-land-for-renewable-energy-and-economic-diversification.aspx.
25. The Queensland Petroleum & Gas Inspectorate has started a consultation process for drafting a Hydrogen Safety Code of Practice, to be published in March 2022. The Code aims to set out safety requirements for hydrogen fuel gas applications. See Queensland Government, "Hydrogen safety regulation in Queensland", 26 November 2021, accessed 17 January 2022, www.business.qld.gov.au/industries/mining-energy-water/resources/safety-health/petroleum-gas/safety-news-education/hydrogen.
26. Energy Ministers, "Extending the national gas regulatory framework to hydrogen blends and renewable gases", 19 October 2021, accessed 11 November 2021, www.energy.gov.au/

government-priorities/energy-ministers/priorities/gas/gas-regulatory-framework-hydrogen-renewable-gases.

27. For example, the South Australian Government has been supporting a project delivering a 5% blend of hydrogen and natural gas through existing infrastructure to 700 homes since May 2021. Additionally, ARENA is trialling an injection of biomethane into the NSW natural gas network commencing in 2022 and the WA Government has awarded a $1.97 million grant towards developing the largest hydrogen blending project in Australia. See *SA Hydrogen-Park*, above n 21; ARENA, Australian first biomethane trial for NSW gas network, accessed 16 November 2021, https://arena.gov.au/news/australian-first-biomethane-trial-for-nsw-gas-network; WA Blending, above n 21).

28. Parliament of South Australia, "Amendments to the Petroleum and Geothermal Energy Act", 3 June 2021, accessed 11 November 2021 at https://yoursay.sa.gov.au/petroleum-and-geothermal-energy-act.

29. Petroleum and Geothermal Energy (Energy Resources) Bill 2021.

30. New South Wales, *Parliamentary Debates*, Legislative Council, 21 October 2021.