22 August 2023

Hydrogen Review Taskforce
Department of Climate Change, Energy, the Environment and Water
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Sent via email: hydrogen@dcceew.gov.au

Dear Hydrogen Review Taskforce

NATIONAL HYDROGEN STRATEGY REVIEW – CONSULTATION PAPER

The Chamber of Minerals and Energy of Western Australia (CME) is the peak representative body for the resources sector in Western Australia (WA). CME is funded by member companies responsible for more than 91 per cent of the State's mineral and energy workforce employment,[1] ranging from mining (mineral and petroleum commodities) to manufacturing (alumina, basic inorganic chemicals and explosives) and supporting services. Within Western Australia the sector is vast and complex, comprising of operations across a diverse grouping of commodity types and traversing stages, from exploration through production and closure.

Submission highlights

The review of the National Hydrogen Strategy is a welcome opportunity to provide feedback from CME members, which include hydrogen industry leaders.

While industry is keen to play its part, overcoming the numerous barriers to a successful hydrogen industry will require considered and substantive support from Government. Our key recommendations are as follows:

- Support both the Supply and Demand side: Our members believe that demand will naturally evolve as commercial hydrogen pathways are realised and developed, but measures that assist hydrogen adoption by end users are likely to be required in the near to medium term for some sectors (e.g. those with difficult carbon abatement tasks). On the supply side, CME believes Government support should focus on developing supply at large enough scale to be internationally competitive. This is likely to involve strategic investment in the hydrogen supply chain, including essential infrastructure and manufactured componentry. CME strongly supports the hub model for industry as a way of improving the bankability of projects, to increase innovation and information sharing while decreasing cost and waste.
- Comprehensive Energy Infrastructure Planning: Relatedly, Government should also work closely with industry to accurately assess the scale of nearer-term electrification requirements across all industries, as well as for the future hydrogen industry. The energy transition has been identified as the biggest challenge facing industry and informed, concerted Government effort will be required to deliver a low emissions, affordable and reliable energy system.
- Streamlined Approvals Processes for Expedited Growth: Perhaps the most impactful action the Government can take to foster hydrogen industry development is by increasing efficiency and removing duplication and complexity across regulatory approvals processes, with widespread feedback that current processes are time-consuming, complex and costly. Simplifying and streamlining regulation would assist to accelerate project development, attract investment and stimulate industry growth. This recommendation and these issues are not limited to the hydrogen industry and apply across all resources and energy projects.
- Industry Collaboration and Genuine Engagement: The Government should ensure it engages in collaborative and authentic engagement with the hydrogen industry. Facilitating direct industry input into reform processes will ensure that policies and initiatives are well-informed, targeted, and responsive to industry needs.

Our detailed responses to the consultation questions are provided below.

Should the Government prioritise ammonia production?

There is understandable appeal in ammonia given this is an established market pathway, and CME member feedback indicates that the market is focussed on ammonia in the nearer term (to 2030). Ammonia is considered an attractive option for transporting hydrogen, as it can be directly combusted for end-use or decomposed to produce high-purity hydrogen. Using ammonia as a hydrogen carrier is seen as a viable solution due to the presence of established global shipping and port infrastructure, enabling more efficient hydrogen transportation compared to traditional liquid hydrogen shipping methods known thus far.[1]

These are strong reasons why ammonia production should be a focus for Australia's national strategy, and CME would support this ammonia production as a focus. However, other hydrogen pathways should also be given sufficient time, space and support given hydrogen is a new frontier in energy and there are still significant lessons to be learned.

Who are going to be the early adopters of hydrogen?

Of hydrogen's short-term pathways, CME would expect to see development in those applications where hydrogen has existing utility, such as decarbonising traditional uses of ammonia, in refineries, in renewable fuel/e-fuel plants and in critical minerals processing. Further down the track possible applications include green steel (direct reduced iron) and aluminium.

Regarding the e-fuel use case, CME considers there is an opportunity for hydrogen to become a substitute for more traditional fuels, particularly in heavy transport. In the context of mining applications, hydrogen is most often referenced for its potential in displacing diesel for haul trucks and heavy rail, and other mobile mining equipment. Gas blending has also been considered an early use case for hydrogen. However, when moving beyond a 10 per cent portion of hydrogen in the networks, a key issue becomes the specifications of appliances that use the gas, which would require changing, and at significant cost. Industrial users also tend to want to receive 'pure' or 100 per cent hydrogen supply and then decide how much of it to blend in with their natural gas supply. Research into networks of 100 per cent hydrogen remain ongoing, and the costs of building a new pipeline or retrofitting an existing network is a significant barrier.

This potential for hydrogen to store energy has been a particular key focus in recent years, having first been proposed in the 1800s.[2] Unfortunately, it is estimated that hydrogen use for this purpose accounts for less than 1 per cent of global production, with hydrogen's chemical and physical properties cited as creating technical barriers for more widespread use.[3] Until further technical developments are achieved, present commercial hydrogen opportunities should be the focus, along with supporting the market to drive the process forward.

What are the barriers out there and what is needed to overcome those barriers?

There are several barriers that need to be addressed to enable the widespread production and use of hydrogen. These barriers can be technical, economic, regulatory and social in nature, and overcoming these barriers requires a comprehensive and coordinated effort from governments, industry and other stakeholders. The following key barriers and potential solutions have been described by CME members:

- High Production Cost: Perhaps the most-cited barrier to hydrogen adoption is the high cost of production, especially for 'green' or 'renewable' hydrogen, which is produced through electrolysis using renewable energy. To overcome this, there is a need for continued research and development, particularly to reduce the costs of electrolysers and improve their efficiency. As outlined further below, despite the costs of renewable energy coming down, there are views that a more technology-agnostic approach to hydrogen production may be warranted.

[1] Currently, the technique for storing a maximum volume of hydrogen in a specific vessel size is to liquify the hydrogen by cooling it to -252.76° C (approximately 20° C warmer than absolute zero). This degree of cooling is 90° C or 56 percent colder than the temperate required to liquefy natural gas. Maintaining liquid hydrogen at this temperature presents significant technical challenges that require vessel design approaching perfect isolation.

[2] Office of Fossil Energy (2020), Hydrogen Strategy – Enabling a Low-Carbon Economy, Department of Energy, United States Government, July 2020

[3] Office of Fossil Energy (2020), Hydrogen Strategy – Enabling a Low-Carbon Economy, Department of Energy, United States Government, July 2020; International Energy Agency (2020), World Energy Outlook: 2020, October 2020; McKinsey & Company (2021), Hydrogen Insights, Hydrogen Council, January 2021

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- Technology Readiness: Another significant barrier is with respect to the development and commercialisation of new hydrogen end-use technologies, such as advanced fuel cells and hydrogen storage solutions. We are still at the early stages of recognising hydrogen's full potential, and Government has a role in supporting industry to move hydrogen forward. Technological development is critical to achieving cost reductions and performance improvements, and the critical efforts to undertake research and development, including collaboration between industry and academia, remain ongoing.
- Infrastructure Investment: The establishment of hydrogen infrastructure, including production, storage, transportation and distribution facilities, requires significant capital investment. Public-private partnerships and Government support in the form of grants, incentives and funding can help accelerate infrastructure development.
- Security of Supply Chain: To establish a competitive hydrogen market by 2030, industry will need to procure significant amounts of manufactured inputs to produce hydrogen at scale. For green hydrogen, this includes large numbers of solar panels (95% of which will be manufactured in China by 2025[4]), wind turbines and electrolysers. Some of these inputs, such as specialist plant, have lead times of more than 5 years. As well as being one of the largest risks to the hydrogen industry, it is also a significant opportunity for the Government to explore ways to secure the supply chain including by developing local capabilities.
- Lack of Scale and Market Demand: With the hydrogen industry still in its early stages, the lack of scale and demand can limit investment and hinder cost reductions. As outlined in the above submission highlights, CME members expect demand will naturally build over time, but measures that assist hydrogen adoption by end users are likely to be required in the near to medium term for some sectors. On the supply side, Government support should focus on developing supply at a large enough scale to be internationally competitive. This is likely to involve strategic investment in the hydrogen supply chain, including essential infrastructure and manufactured componentry.
- Skilled Workforce: The hydrogen industry requires a skilled workforce with specialist expertise; however, access to such a talent pool is currently limited, with the resources and energy sector experiencing persistent labour shortages despite a concerted focus on training and future workforce pipeline development. There are levers that Government can pull to assist in this regard, including recent improvement in skilled migration intake and visa processing times.

Addressing these barriers requires a coordinated approach and collaboration between governments, industry, research institutions, and other stakeholders. **Our core recommendation is that Government facilitate genuine visibility and input by industry into the reform processes**.

Should there be national targets or mandates with respect to hydrogen production or usage?

It is our view that the **Government should consult with industry regarding the setting of any targets or mandates for hydrogen production and/or usage**. With demand for hydrogen not forecast to increase substantially until at least 2030,[5] and uncertainties around technology advancements and production costs, imposing targets without industry consultation could lead to unrealistic goals or inefficient resource allocation both within industry and Government. Conversely, a well-considered, co-designed target or mandate could have significant benefits such as signalling to domestic and international markets the level of Government support for hydrogen industry development as part of Australia's clean energy future.

Relatedly, there is a role for Government to provide a clear policy framework that supports the development of the hydrogen industry. The Government should provide incentives to support industry to meet any targets or mandates as well as fund research and development, create a favourable regulatory market environment, and promote collaboration between stakeholders to drive the growth of the hydrogen sector in a sustainable and efficient manner.

[4] International Energy Agency, Special Report on Solar PV Global Supply Chains https://iea.blob.core.windows.net/assets/d2ee601d-6b1a-4cd2-a0e8-db02dc64332c/SpecialReportonSolarPVGlobalSupplyChains.pdf
[5] Australian Energy Market Operator (AEMO), 2023 Gas Statement of Opportunities, pages 27 and 28

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What are the most significant supply chain barriers being faced by hydrogen?

CME members expressed a strong view that supply chain risks remain the biggest challenge to the future hydrogen industry in Australia.

A viable, large-scale green/renewable hydrogen industry will require a very large quantum of renewable energy. Favourable conditions are required, with coastal desert locations considered ideal as they generally have comparatively flat land, good wind availability at night and good solar radiation during the day, as well as access to water and shipping infrastructure. Western Australia is attractive in this regard.

However, this requirement for large-scale renewable energy will put immense pressure on supply chains. Not only will there be large renewable electricity demand for green hydrogen projects, but other industries, such as the broader mining and energy sectors will also be decarbonising their operations, including through electrification, in order to meet both voluntary and legislated targets.

Australia is expected to require the import of millions of solar panels and thousands of wind turbines. With most renewable energy components being procured from overseas, domestic industry will be vulnerable to time delays and global protectionism.

There will likely be severe and intense demand pressure placed on all aspects of the supply chain infrastructure, including shipping containers, port capacity, road and rail capacity both within Australia within the country of origin. The recent experience of the COVID-19 pandemic highlighted the vulnerability of supply chains and the substantial impacts when they are disrupted.

On that basis it is CME's view that Government support for the hydrogen industry is best placed by focussing on supply chain resilience and supporting infrastructure.

Should Australia develop and support local manufacturing capabilities to secure the supply chain?

Given industry's serious concerns about supply chain risks, CME considers that all options to address those risks should be considered, including with respect to Government playing a role in developing and supporting local manufacturing capabilities.

Precisely where and how the Government should perform this role is a difficult question, and one that is easy to get wrong, with misplaced support that does not adequately consider international market competitiveness leading to inefficient outcomes. CME would strongly suggest that industry, at the forefront of hydrogen's evolution, would have the operational and market intelligence to help co-design support measures that would provide meaningful benefit. It is through such meaningful Government-industry collaboration that Australia's hydrogen industry can help set itself up for its important future.

On that basis, we recommend Government works with industry to establish a framework for ongoing dialogue on supporting the development of a hydrogen supply chain.

What is the role of industry and governments to ensure an appropriately sized and skilled workforce?

The mining and energy sector has been heavily investing in both the upskilling of existing workers and the addition of high numbers of apprentices and trainees to meet ongoing demand. However, sustained labour market pressure in both the Western Australian and national economy is being felt across our industry.

Whilst every effort to secure a local workforce is made, the large and complex nature of resource sector projects, including hydrogen, highlights an on-going requirement to source experienced and highly skilled professionals from international talent pools. This is particularly important when considering pathways to realise the ambitions of decarbonisation and energy transition, and when supporting the development of value-adding industries.

The challenge for industry and Government alike is to increase that level of access to a skilled workforce. For example, and similarly to Victoria and Queensland, Government could assist with funding to apply a payroll tax rate discount for eligible regional-based employers to boost employment in regional and remote Western Australia, where skills gaps are often acute.

Within the Government's jurisdiction, there are also direct measures that can be employed, particularly in the migration space. For example, there is opportunity to streamline and simplify requirements of the Skilled Nominated and Regional (Provisional) Skilled Nominated visa categories to encourage permanent residency transition and increase recognition of hydrogen sector occupation categories.

The Government also has a role in increasing investment and incentives for tertiary education. There is significant benefit to be realised by Government investing early in the skills needed both now and in the future as part of a developing hydrogen industry. The industry also recognises the importance of equipping the next

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generation with the skills required to take up the exciting opportunities across the mining and energy sectors, including exciting developments in 'new energy' such as hydrogen. In this regard, there is an opportunity for industry to work with the university sector to develop hydrogen-specific micro credentials, specialising the existing skilled professional workforce.

To assist in attracting more Australians to take up these studies and consider these future employment opportunities, there is an opportunity for industry and Government to work together to publicly position the resources and energy sectors as industries integral to the future of our nation and more specifically as industries which offer rewarding, diverse and safe employment options. The resources and energy sector has been impacted by the labour shortages alongside all other sectors, and support by Government to assist in broad community education with respect to the industry's contribution and employment opportunities will help drive industry productivity and bring even further economic benefit to the nation.

In addition to the importance of the development of skills in the broader energy and resources sector, CME recommends **Government establish a collaborative forward-looking plan for ensuring a well-trained workforce, which will be pivotal for the hydrogen value chain in Western Australia**.

In addition to electrolysers, where do you see a role for hydrogen in manufacturing?

Overarching all potential hydrogen manufacturing opportunities is the importance of establishing a pathway to scale to reduce costs. **That pathway can be facilitated through industrial hubs, achieving the benefits of co-locating industrial projects**. For example, there are benefits to locating electrolysers near to cement plants. This is because electrolysers yield both hydrogen and oxygen, and the oxygen can be used in cement production to produce higher quality clinker, reduce emissions or increase production rates. Further, carbon dioxide emitted from cement plants could be captured and used with hydrogen in the production of synthetic e-fuels.

In considering these opportunities it is important to maintain a focus on where we are able to compete in the value chain, and Government can play an important role facilitating the development of feasibility studies, and putting downward pressure on capital and operational costs through industrial hubs and clear land tenure pathways.

Specific hydrogen manufacturing opportunities include those where it can be combusted for heat generation and reducing emissions in existing manufacturing processes. Materials such as cement and lime, for example, require very high temperatures in their production process. Ordinarily, fossil fuels generate that required heat, but not without significant carbon emissions.

Given Western Australia's significant iron ore and metal alloying resources, there are opportunities that could be further explored with respect to a domestic green steel industry. Steel making accounts for around 5-9 per cent of global GHG emissions and presents a challenging decarbonisation pathway of finding an alternative to coal/coke as the reductant required for steel making.[6]

While high costs and a small domestic market and international competition for exports may ultimately render this prospective new sector unviable, CME considers it is worth further investigation.

There may also be an opportunity, as outlined by the Mineral Institute Research of Western Australia (MRIWA), to produce direct-reduced iron locally, initially using gas-based direct reduction then subsequently through hydrogen direct reduction, and exporting overseas to be refined to steel. This 'green iron' is another potential demand use for green hydrogen.

In addition to commercial cost, what is preventing Australian hydrogen projects progressing beyond FID?

Certainty of land tenure and infrastructure that enables renewable generation and hydrogen production at scale is a critical component in establishing a competitive hydrogen sector in Western Australia.

For the growth of a robust green hydrogen sector in Western Australia, it will be important to provide a clear and cost-effective pathway to enable access to large land areas with secure tenure. Despite Australia's extensive landmass, the availability of sizeable freehold title land in Western Australia is limited. The majority of Crown land parcels that hold commercial potential due to their proximity to infrastructure are marked by

[6] Most steel is produced in a blast furnace. Coal is used as a reductant to produce iron metal, and in doing so, carbon reacts with oxygen in the iron ore to produce CO2. Steel can also be produced by a direct reduction process, where natural gas is used as a reductant to produce iron metal. This method emits around half the CO2 per tonne of steel compared to the blast furnace method and is commercially available technology. This method is commonly used to recycle scrap steel. Several trials are now investigating using hydrogen as a direct reductant, further reducing GHG emissions.

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intricate overlays of pastoral, mining and other tenures, along with native title claims and rulings, as well as competing cultural, environmental and other interests.

This issue of land access is and will prevent projects progressing beyond FID. CME members believe it can be addressed, most pragmatically through the development of well-considered, large-scale renewable energy zones that are in close proximity to hydrogen production facilities and infrastructure enhancing market access. Early stage tenure and environmental requirements should be considered by government when the renewable energy zones are established. Along with other aspects of the energy transition, this needs to be progressed as quickly as possible.

What further regulatory work is needed?

Governments around Australia are identifying the need for more planning on hydrogen. We understand that in addition to the national strategy being revisited, the WA Government is considering revisiting their own strategy. Other bodies, such as the CSIRO, have also produced their own strategies or roadmaps. Despite a common goal to see a successful Australian hydrogen industry develop, each published strategy emphasises different competitive strengths, preferences and objectives.

While the level of interest appropriately reflects the opportunity hydrogen presents, it will be important to ensure that State and Federal approaches are aligned, to support the coordinated development of the sector and avoid unnecessary duplication.

Strategic alignment has a number of benefits. From a perspective of international competition, a unified vision is an important message to send to foreign investors. Likewise, within Australia, consistency across strategies provides for certainty, which is needed to support industry development.

CME believes that alignment can be best achieved by open and transparent consultation between industry, State and Federal bodies, so there is clear understanding around how government reforms will meet stated goals and ambitions and how reform will impact business.

Further to the above, industry would like greater certainty over future regulation of the hydrogen sector. Workplace health and safety regulation has been identified as a key area that requires consideration, specifically relating to hydrogen and ammonia. In this regard it is important that Government maintain open dialogue with industry to determine a regulatory environment which preserves these margins for a viable industry.

How can we ensure our hydrogen industry develops in a way that benefits all Australians?

The resources and energy sector contributes strongly to the Australian economy. In 2021/22 alone, the sector provided almost $100 billion in direct economic benefit, including $28.9 billion in payments to the Federal Government.[7] All Australians stand to benefit from economic activity generating by the sector and will continue to do so into the future.

A strong, market-led commercial hydrogen industry will add further benefit to the Australian economy in the same way that our resources and energy sector does today.

Feedback from industry suggests the single most beneficial way in which Government can help grow the hydrogen industry is by **streamlining approvals processes** to make them faster and simpler to navigate.

Recent and proposed reforms to climate, heritage and environment legislation and policy at both state and national levels will continue to contribute to uncertainty and investment appetite. In achieving their objectives these reforms must avoid unnecessary scope creep and duplication and improve process efficiency for projects.

The end-to-end approvals process can take 10 to 15 years[8] from exploration to mining stage, during which the State and Commonwealth environmental approvals process alone typically consumes 2 to 5 years. In contrast, these approvals in some international jurisdictions can generally be achieved in a matter of months. For example, in 2022 67 percent of mining projects in the United States received all required approvals and permits to conduct exploration activities in less than 6 months, compared to 19 percent in Australia.[9]

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[7] Chamber of Minerals and Energy WA, Economic Contribution Fact Sheet 2021/22.

[8] IEA, *The Role of Critical Minerals in Clean Energy Transitions* , p. 122.

[9] Fraser Institute (2022), Annual Survey of Mining Companies 2022, p51

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To capitalise on hydrogen opportunities and support the ongoing viability and sustainability of our resources and energy sector, it is crucial for the Federal Government to work alongside States to:

- Ensure proposed significant reforms at a Federal level do not introduce duplication to the robust assessment and approvals processes conducted at a State level.
- Identify and pursue reforms to streamline and simplify processes and regulation to address the growing regulatory inefficiency (without compromising regulatory outcomes and intent) and facilitate timely project development.
- Actively assist proponents to navigate approvals processes and provide certainty for those already in the pipeline to support investment.

How should water security be balanced between hydrogen industry and other users?

As the cost of renewable electricity supply decreases and electrolyser efficiency improves, questions are logically asked of the other ingredient to produce hydrogen by electrolysis – water.

Accessible freshwater makes up just less than 1% of the planet's water[10,11] and given existing freshwater supply issues, such as those well-documented in the Murray-Darling Basin, it is expected that water purified through desalination processes would be the predominant source of electrolysis feedstock.

Studies have found that a global target figure of 2.3 Gt of hydrogen each year would require about 30 parts-per-billion (or 0.000003%) of the world's available supply of seawater, a negligible amount compared to the resources available.[12]

The leading desalination technology today is reverse osmosis, which consumes less energy than other desalination methods such as distillation.[13] Despite this, desalination remains an energy-intensive process because of the energy required to separate salts and other dissolved solids from water.[14]

On that basis we recommend the **Government focus on the energy aspect of the electrolysis process, facilitating the generation and transmission infrastructure to supply abundant, cost-competitive, low emission energy**. This includes ensuring efficient, streamlined approvals processes for all generation and transmission infrastructure.

Member feedback indicates that renewable hydrogen projects are likely to produce their own fresh water, and many powered by behind-the-meter renewable energy generation. Industry is looking at potential opportunities associated with those additional sources of fresh water in regional Australia, including how they might supply water to broader industry and local communities. While it's unclear how this opportunity will develop, strong consideration is being given by industry to a broader use of these new water resources, and Government should consider discussing with industry as to how it can facilitate this further.

How should we develop the necessary infrastructure needed to support the development of the hydrogen industry?

CME supports the hub model for hydrogen infrastructure in line with the existing National Hydrogen Strategy, which also supports the creation of hydrogen hubs and clusters to drive innovation and reduce costs. Substantial funding was made available in support of the strategy, to develop hydrogen hubs in regional Australia, and we would like this focus on hubs to continue in the revised strategy.

Industrial hubs offer a model where organisations can gather around a shared endeavour or activity and with an approach that shares information and leverages each other's expertise. It can lead to technology breakthroughs, cost reductions and the utilisation of products that would otherwise be wasted. Globally, ports are an attractive area to establish hubs and provide helpful case studies on what attributes can establish a successful model.[15]

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[10] Greenlee, L. F.; Lawler, D. F.; Freeman, B. D.; Marrot, B.; Moulin, P. Reverse Osmosis Desalination: Water Sources, Technology, and Today's Challenges. Water Res. 2009, 43 (9), 2317– 2348,

[11] Miller, J. E. Review of Water Resources and Desalination Technologies, Sandia National Laboratories: Albuquerque, NM, March 2003

[12] Beswick, R.R.; Oliveira, A.M.; Yan, Y. Does the Green Hydrogen Economy Have a Water Problem?, ACS Energy Letters 2021 6 (9), 3167-3169

[13] Cherif, H.; Belhadj, J. Environmental Life Cycle Analysis of Water Desalination Processes. Sustainable Desalination Handbook; Elsevier, 2018; pp 527– 559.

[14] US Department of Energy, Powering the Blue Economy: Exploring Opportunities for Marine Renewable Energy in Maritime Markets, April 2019

[15] See for example Port of Rotterdam, Port of Hamburg, Port of California.

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The cost reductions achieved in hub models also help in facilitating economies of scale, and CME members have identified that achieving large-scale operations is critical to establishing a competitive hydrogen industry. By having efficient, strategic hubs, which are supported by feasibility, industry can reduce construction and operating costs, assisting it to reach a competitive scale.

Regardless of how hydrogen is produced, it will require storage and transport (e.g. roads, pipelines and ports) infrastructure. As such, Government needs to consider not only potential hydrogen production hubs, but also the supporting infrastructure.

Tellingly, leading examples such as the Port of Rotterdam and Teesside Hubs – incorporate multiple hydrogen production technologies and end-use cases. Continued State and Federal Government efforts aimed at hub activation, will be important to realise the opportunity for hubs in WA to support commercialisation and market activation.

How should the infrastructure needs of the hydrogen industry be balanced with other infrastructure users including electricity generators?

This is an important question given the step change that will be undertaken in the coming years with respect to energy generation, storage and transmission infrastructure.

CME members are developing and implementing plans to reduce emissions to achieve net zero emission targets by 2050 or earlier. This reduction in emissions requires a switch to cleaner forms of energy.

While CME members were already committed to reducing their emissions, and taking positive steps to do so, the need for immediate, focused effort on decarbonisation has been reinforced by domestic and international obligations.

For many CME members, decarbonisation will involve some combination of energy efficiency improvements, emissions reduction, carbon sequestration (carbon capture utilisation and storage (CCUS) and/or nature-based methods) and switching to low carbon energy sources.

The lack of readiness of abatement technology will mean some organisations will be dependent on realising shorter term reductions through consumption of electricity sourced from low emission (renewable) generation. This includes the conversion of existing processes from using fossil fuels to electricity, with that electricity again sourced from low emission generation.

In May 2023, the WA Government published the South West Interconnected System (SWIS) Demand Assessment, which demonstrates significant expansion of the transmission network will be required to meet industrial demand for green electrons over the next 20 years. Under its preferred scenario, the demand assessment shows peak demand would almost triple by 2042, requiring almost 10 times the current amount of generation and storage capacity, and over 4,000 km of new transmission lines to transport that energy from where it is produced to where it is used.[16]

Noting the above, CME considers **Government should work closely with industry to accurately capture the scale of infrastructure needs for nearer-term electrification requirements as well as for the future hydrogen industry**.

How can agreements with other nations best support Australia's hydrogen strategy?

Agreements with other nations can play a crucial role in supporting Australia's hydrogen strategy by creating a favourable environment for the development, production, export and utilisation of hydrogen.

Bilateral and multilateral agreements can provide Australia with access to established hydrogen markets, allowing for stable and predictable trade relationships. Agreements could include commitments on market access, tariffs, quotas, and other trade barriers that can impact the flow of hydrogen products. Industry is reporting positive outcomes arising from the bilateral agreement with Germany and are looking forward to the rollout of additional programs announced by both Japan[17] and Germany,[18] with further details on each expected late in 2023.

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[16] WA Government, SWIS Demand Assessment 2023 to 2042, May 2023, page 4

[17] Japanese Government, Ministry of the Economy, Trade and Industry, via: https://www.meti.go.jp/shingikai/enecho/shoene_shinene/suiso_seisaku/20230606_report.html

[18] Government of the Republic of Germany, via: https://www.bmz.de/de/aktuelles/aktuelle-meldungen/de-foerdert-weltweit-aufbau-gruener-wasserstoffwirtschaft-128378

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Within these international discussions, Government should place emphasis on continued consultation, active working groups and technology-sharing, particularly given the absence of skilled workers in the required numbers. The German-Australian Hydrogen Alliance has been highlighted by our members as a good example of how international collaboration can be fostered.

The Government should also consider where it can harmonise regulatory frameworks and standards with partner countries, which can reduce trade barriers and increase market acceptance. Such alignment could cover safety regulations, quality standards, and carbon certifications to ensure the interoperability of hydrogen technologies.

Finally, agreements can promote information sharing on best practices, lessons learned, and successful strategies for building a robust hydrogen industry. This sharing of experiences can help Australia overcome common challenges and seize opportunities.

How should Australia ensure that the necessary foreign investment in hydrogen industry and export projects leads to lasting benefits for all Australians?

As a price taker in a global market, maintaining a low-cost operational base is fundamental to the competitiveness of the Western Australian resources sector, and that includes the hydrogen industry. Material changes in cost structures can significantly affect cash flows across the life of an asset, scuttling new projects before they commence, bringing forward the end of life of existing projects and reducing the ability to use margins to expand existing projects or invest in new projects.

Certainty in a stable, low-cost investment and operating environment will be essential to providing the industry with the necessary confidence to continue investing against the ongoing risks of supply chain disruptions, labour and materials price escalation, and the tightening of financial conditions.

To support the development of the hydrogen industry, governments should provide clarity around the taxation and royalty settings expected to be applied to the industry. These settings should balance the benefits and returns to all Australians with the need to ensure a cost-competitive playing field. The importance of a cautious and consultative approach to any changes as industry development accelerates cannot be overstated.

Certainty is critical to attracting new foreign investment, as well as preserving the value of existing investment. Competition for global investment in hydrogen will be fierce in the coming years, and Australia's reputation as a stable, cost-competitive jurisdiction needs to be maintained if we wish to compete effectively.

Doing so will lead to lasting benefits for all Australians, as we develop a world-class hydrogen industry, with the capability to produce clean energy at scale.

Contact

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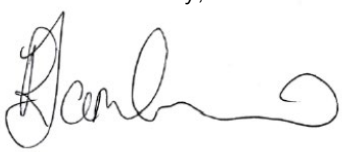
Yours sincerely,



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