

NATIONAL HYDROGEN STRATEGY

Response to issues papers

Submission by Hydrogen
Mobility Australia

July 2019

About Hydrogen Mobility Australia

Hydrogen is a highly versatile energy carrier that has been recognised globally as playing a potentially significant role in future sustainable energy systems. A hydrogen economy represents a solution to reduce greenhouse gas emissions and the world's reliance on fossil fuels.

Hydrogen Mobility Australia (HMA) is a membership-based industry association with a mission to realise a hydrogen economy for Australia. Through government advocacy, education and industry engagement, we are working to facilitate the introduction of hydrogen and fuel cell technologies to Australia.

Our membership comprises vehicle and component manufacturers, energy and technology companies, and infrastructure providers with interests across the hydrogen value chain, including hydrogen production, storage, export, power-to-gas, distribution and mobility. Together we recognise the significant opportunity the economy-wide application of hydrogen presents for Australia to decarbonise, diversify the energy mix and create jobs, investment and innovation.

As a hydrogen advocate, HMA's objective is to support the growth of this new energy sector in Australia by:

- Accelerating the commercialisation of new hydrogen and fuel cell technologies by engaging with governments to create a conducive policy and regulatory environment.
- Providing a forum for effective communication and collaboration of stakeholders in the hydrogen and energy community across the public and private sectors.
- Progressing Australia's shift towards a future hydrogen economy built upon clean and renewable energy technologies, through advocacy and education exploiting the expertise, know-how and commercial drive of the HMA members.

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HMA position

Hydrogen Mobility Australia (HMA) welcomes the opportunity to provide input to the National Hydrogen Strategy Issues Papers, developed by the COAG Energy Council Working Group (the Working Group).

We strongly support the Working Group's consultation to date, and the thoughtful and comprehensive approach taken to the Issues Papers. This is a rare opportunity to be part of a true industry changing period in energy and transport, and the development of the National Hydrogen Strategy is an essential piece of the required policy thinking.

Rather than respond to the papers in detail, we have chosen to provide high level views regarding the key strategic priorities from our perspective.

These positions are summarised below and are discussed in more detail in the following pages.

1. **Government support remains vital.** HMA welcomes and acknowledges the support from all levels of government to develop the industry to date. However, the need for policy and funding support remains high if we are to get the industry to scale and deliver benefit to Australian consumers. This means:
 - i) The National Hydrogen Strategy should be ambitious and should set clear targets across the hydrogen value chain for hydrogen production, hydrogen injection into natural gas networks, introduction of light and heavy fuel cell electric vehicles (passenger cars, buses, trucks, trains and ferries) and hydrogen refuelling stations.
 - ii) In the early stages of hydrogen applications that we see today, grant funding is essential. ARENA should be funded beyond its current remit.
2. **Obtaining a social licence for the sector must start now.** This includes creating effective and meaningful regulations, information and community engagement. HMA is keen to work with government to create an industry-led code of conduct for working with local communities.
3. **Integrated governance is a priority to create a stable and efficient investment environment.** Hydrogen production and use interacts with several established (and previously separate) sectors. This means that regulatory settings need to be considered differently from the past. HMA is in a good position to assist governments and regulators to harmonise approaches across sectors and across jurisdictional boundaries.
4. **AEMO should have a role in planning hydrogen production, location and transportation,** perhaps as part of its Integrated System Plan.
5. **A hydrogen accreditation scheme must be in place soon** to satisfy domestic and international customer requirements. HMA is developing thinking on the best way to achieve this and would like to discuss this with the Working Group.

Building a domestic hydrogen market

As noted by the Working Group, modelling by ACIL Allen estimates that hydrogen exports could provide around \$4 billion in economic benefits to Australia by 2040 under medium demand growth settings.¹

While a hydrogen export market clearly creates jobs and growth for the Australian economy, it requires a domestic hydrogen economy to be efficient and cost competitive. A domestic industry is required for export because it means that the necessary skills, capability and capacity for a thriving export industry have a better chance of being developed. A domestic market provides a platform and test bed to build scale for future exports that take more time to develop, including providing an offtake.

A domestic industry is also required for local purposes. Hydrogen from renewable sources aids in Australia's progress to decarbonise its economy. Hydrogen also provides energy diversity for Australia. The ability to couple what have been traditionally separate energy types will bolster the resilience of our energy market in the case of unforeseen events.

Similarly, a domestic industry can improve energy reliability and affordability by acting as an energy storage medium by smoothing the effects of volatile and intermittent renewable electricity generation. Battery technology does not allow for the same level of extended energy storage, and pumped hydro is not possible nor feasible at many locations.

The fact that hydrogen can be produced from water, and that it can be stored long-term, means that hydrogen should have a key role to play in Australia's energy mix. Its versatility means that hydrogen can shift energy across time and space in a way not previously observed in the energy mix.

Getting the hydrogen industry to scale

The development of the Australian hydrogen market require support to achieve scale. As we advised in March, the greatest challenge facing the hydrogen sector at present is cost of production infrastructure, combined with a lack of a viable local hydrogen marketplace. While many of the required technologies are already available today, competitive cost of supply via market demand can only be achieved with scale in parallel with a market pull for hydrogen.

The magnitude of investment necessary to develop a hydrogen industry of the scale described by various organisations, including the Hydrogen Council and ACIL Allen, could be tens of billions of dollars by 2050. Many of the conditions necessary for such investment to occur in Australia are the same as for other large energy or resource investment, such as openness to foreign investment, stable policy/limited sovereign risk, and private sector appetite.

¹ ACIL Allen Consulting for ARENA, *Opportunities for Australia from Hydrogen Exports*, August 2018.

Government policy

An enduring climate policy which places a value on emissions would be a singularly valuable instrument to guide both domestic and international investment across the various sectors in which hydrogen can be deployed. In the absence of this, Government efforts to support the Australian hydrogen sector should focus on targets and long-term policy signals, and on national funding through ARENA (in the first instance).

We agree with the Working Group that the Australian Government has an important role to advocate and lead on a range of hydrogen industry matters through multilateral engagement across a variety of international organisations.²

On the domestic front, HMA believes that the sector coupling aspect of hydrogen should be strongly valued by Government and reflected in policy support. As noted in many of the Working Group's issues papers, hydrogen enables energy to flow between the electricity, gas and transport systems. This sector coupling capability makes hydrogen incredibly valuable. In theory, one electrolyser (or bank of electrolysers) can produce hydrogen for fuelling a wide range of light and heavy vehicles, for blending into the natural gas networks, for industrial processes, and for electricity grid stabilisation. Demonstration projects to prove this cross-sector application are coming online, such as ATCO's Clean Energy Innovation Hub (WA), AGIG's Hydrogen Park SA (Hyp SA) and Jemena's Power to Gas Trial (NSW). These and other projects will provide valuable learnings to aid the development of commercial models for large-scale hydrogen production and use.

While it is encouraging that there are major demonstration projects, the leap from demonstration to commercialisation is significant. A key reason for this in Australia is the high cost of electrolysers, which are not yet produced in commercial quantities. Incentives are needed to help increase the volume of hydrogen demand, which in turn creates the market for electrolysers. If incentives then also worked across sectors, we would see faster and more efficient growth of the hydrogen industry, which would have the benefits outlined above.

As we have noted previously, starting with transport is a sensible approach for building familiarity with the production, handling and use of hydrogen, through the introduction of tried and tested technologies, such as fuel cell electric vehicles. It also creates a market pull for hydrogen, with production likely to scale over time as vehicle volumes grow and other hydrogen applications multiply. Bus fleet look particularly promising as a first step, as these are back-to-base and so do not require extensive refuelling infrastructure. Hydrogen buses are used overseas, and hydrogen as a diesel replacement also improves air quality.

Table 1 provides a basic overview of the sectors coupled by hydrogen, with suggestions regarding policy priorities for market activation.

² See Issues Paper 3, p.6.

Table 1: Hydrogen across sectors of the economy

Key aspects	Gas	Electricity	Transport	Industrial use
Why hydrogen	Decarbonise heating: electrolysers connected to existing gas pipelines enable 'power to gas'.	Electricity system resilience via grid firming; hydrogen can store energy far longer than other technologies.	Decarbonise transport, where FCEVs have a longer range and are faster to refuel than BEVs. Provide diversity in the fuel/technology mix. Community use of FCEVs – particularly buses – builds support for hydrogen across its various uses.	Decarbonise use of hydrogen as a chemical feedstock.
What we can learn	Technical, safety and community concerns are starting to be addressed, such as through the Future Fuels CRC work.	Off-grid systems provide an opportunity to learn about what is necessary to build the industry.	Community response to FCEVs will have a fundamental impact on the emerging hydrogen industry. ³	Decades of industrial experience and knowledge about the safe handling of hydrogen.
Policy priorities for market activation	Potential natural gas blending target.	Address opportunities in remote areas of Australia to replace diesel standalone power systems. See also defence force applications.	Demand creation: Targeted refuelling infrastructure; particularly back to base use. Fleet procurement by government and business, particularly as a diesel replacement. Consumer education. Purchase rebates for low emission vehicles, amended stamp duty/vehicle registration calculations, rebates for trade-ins. Local and state based 'lifestyle' incentives (e.g. Oslo) such as use of transit lanes, free parking reduced tolls, reduced stamp duty and registration.	New technology investment rebates (perhaps via tax) that use clean hydrogen to displace gas.

³ Noting that fuel cell bus deployment in Europe, North America and in Asia has helped public awareness and acceptance.

Given the uncertainty in predicting the rate of market maturation, it is reasonable to establish a framework of mechanisms mapped to 5-year intervals to provide the market with some degree of investment certainty. The framework would identify when and for how long mechanisms such as funding, underwriting risk or demand side targets would run for, when taxes, excises or royalties would be introduced, and at what rate. A regular review of mechanisms aligned to the intervals would be required to adjust the original framework to ensure that they align with the hydrogen market development.

Any incentives or government policies created to drive scalability should be technology agnostic and not pick winners. Funding should be structured around approving projects that will, when aggregated, achieve the forecasted low, medium or high demand case as outlined in the ACIL Allen report for ARENA.

Further, given there is no single entity that is able to manage the end-to-end supply chain from hydrogen production through distribution to retail, government policy and action (policy mechanisms) should seek to ensure that any part-player in the supply chain can make a reasonable investment decision within a secure overall framework.

Direct funding

Funding support is critical while a robust hydrogen marketplace does not yet exist. The current phase of hydrogen industry development means government support is necessary to secure the business case for many projects. This is like the support the Australian Government has provided – and continues to provide – to establish the solar and battery industries in Australia.

We note that as at 30 June 2019, ARENA had total funds available to commit to new projects of \$279.4 million. This is for all renewable energy projects, of which hydrogen is only one aspect. Further, ARENA has advised that its funds will be fully committed in the next 12-18 months.⁴

There is a genuine risk that there is insufficient grant funding remaining for Australia to develop a substantial position in this fledgling industry. In the early stages of hydrogen applications that we see today, grant funding such as is provided through ARENA is essential. This funding will help drive down costs, build knowledge and expertise and reduce the risk of larger scale investments.

Importantly, although grant funding should be deployed on a technology neutral basis within the hydrogen sector, it should not be required to compete for funding against other energy carriage sources (such as batteries, transmission lines, or battery electric vehicles) that cannot deliver the sector-coupling applications that hydrogen can. Further, for a level playing field, the full environmental costs of all alternatives should be understood.

Government could also provide other direct incentives to facilitate the establishment of the hydrogen industry at scale, including direct subsidies for every kilogram of hydrogen produced, feed in tariffs, and a honeymoon period from fuel excise when hydrogen is used in transport applications.

⁴ See <https://arena.gov.au/funding/>.

Legal and social support for the emerging hydrogen industry

Like any new large-scale industry, the emerging hydrogen industry requires a trusted and positive relationship with consumers and with communities living near infrastructure. For the industry this is a matter of obtaining and maintaining a social licence, and of working with policymakers to ensure policy and regulatory regimes are properly targeted to avoid harm. Policy and regulatory regimes must also be clear, stable and efficient to create an attractive investment environment.

Social licence

While hydrogen has been produced and transported in large quantities as a chemical and industrial gas in Australia for many decades, public understanding of, and exposure to, hydrogen is still relatively low. The large-scale development of hydrogen through newer production pathways such as electrolysis also brings a new requirement to engage communities about any concerns regarding land, water and safety.

An important way to address public concern is through the development and implementation of appropriately responsive regulatory settings. This means that regulations are effective – they are at the right level to protect the community from harm and to provide appropriate guidance to industry. As we have advised previously, there is a process in place to mirror existing ISO standards into Australian standards through a Standards Australia committee, which includes HMA membership.

Communication about Australia's progress in adopting the international standards for hydrogen production, handling and use should be a priority for policymakers, including communication with other government departments and agencies across coupled sector portfolios. Initiatives such as the International Conference on Hydrogen Safety, which will be hosted by the South Australian Government in September 2019, also provides an opportunity to understand best practice from leading jurisdictions.

We support the work of the Future Fuels CRC in considering approaches for securing social licence through research projects and engagement with communities. HMA is also considering the best way of directly creating and providing meaningful information to policymakers and communities about key issues, including consumer and third-party safety, and the management of water resources.

Importantly, we agree with the Working Group's view that the National Hydrogen Strategy 'presents an opportunity to establish best practices for how industry and governments will engage with communities', and further, that this might include the development of an industry code of conduct.⁵ We note the Working Group's view that a code of conduct could provide a means for industry to commit to agreed principles for community engagement, including principles such as respect, transparency, and inclusiveness.⁶ HMA is keen to take a lead on the development of such a code, in partnership with government, consumer representatives, and academia. Many of HMA's members engage with consumers daily, and several are already engaging with communities about hydrogen.

⁵ See Issues Paper 5, p.12.

⁶ Ibid.

Efficient regulation and policy

Given the ability for hydrogen to connect different sectors, regulatory efficiency is extremely important. This is a separate matter from the previous discussion of regulatory effectiveness. The issue here is integrated governance, that is, to make sure that the relevant regulatory regimes across different sectors (such as electricity, gas and water), different issues (such as safety, environmental protection and training) and different parts of the various value chains (such as producing and transporting for different uses) are suitably consistent and do not unnecessarily hinder market development.

The Working Group has noted the stakeholder concern that the National Electricity and Gas Objectives, Laws and Rules require a level of harmonisation given that hydrogen could play a role in both markets and that hydrogen allows for choices *between* building gas or electricity infrastructure in the long-term interests of consumers.

We agree with the stakeholder concern about the fitness for purpose of energy legislation and rules for hydrogen. The electricity and gas regulatory frameworks were not designed with hydrogen in mind; therefore, there needs to be appropriate flexibility in their application. For example, the current RIT-T and RIT-D processes require electricity networks to identify credible options, but there is no incentive to consider co-optimised solutions with gas networks.

Our members' experiences with attempting to roll out LNG along the east coast have also highlighted the need for consistent regulation and standards across all states and territories. Other lessons learned from major industries during scale-up include development of standardised curriculum for trade, and tertiary training of staff, to ensure portability of the workforce between projects and consistent quality and safety standards across Australia.

Our view is that the regulatory and policy settings should allow for the best energy outcome, regardless of whether this is energy from electricity or gas. Ideally the policy setting will move towards a single energy market, as hydrogen allows for coupling/co-optimisation. It is vital that hydrogen production and use be given flexibility to discover its appropriate role(s) in energy markets, while maintaining strong standards of public safety and consumer protections.

There may be an opportunity for legislative and regulatory reform to establish an overarching National Energy Objective, rather than there being separate gas and electricity objectives. If the objective is the 'long-term interests of energy consumers', and the relevant investment tests are also seeking the 'lowest sustainable cost of providing energy services', then this may support the co-optimisation of hydrogen and electricity systems.

This work to address harmonisation must start soon. Our experience in past energy regulatory change is that the process is long and uncertain, and rules can be outdated even at first implementation. The opportunities to create meaningful long-term consumer benefit from a hydrogen domestic market are too important to allow regulatory change processes to be ineffective.

Reforms currently being considered by the Australian Energy Market Commission to allow for regulatory 'sandboxes' for innovation could be useful as appropriate regulatory frameworks develop.⁷ Waivers from

⁷ See https://www.aemc.gov.au/news-centre/media-releases/aemc-recommends-regulatory-sandbox-toolkit-support-innovative-trials?utm_medium=email&utm_campaign=New+AEMC+Update+

rules, or changes to rules to allow proponents to test projects, could provide the flexibility needed before a longer-lasting economic regulatory framework is established. The National Hydrogen Strategy should consider specific ways such regulatory flexibility might be achieved.

HMA welcomes initiatives such as the South Australian Hydrogen Regulatory Working Group, which includes the Metropolitan Fire Service and all other workplace safety, environmental, planning and technical regulation authorities that will be involved in the permitting of hydrogen facilities. We believe this works best at deployment level (that is, jurisdictional and local governments), with coordination across states facilitated nationally to ensure consistency in planning/regulation.

On the export front, the establishment of a successful hydrogen export industry for Australia requires us to be a cost competitive energy supplier. Adoption of international standards (where these exist) will assist in this because it allows efficient engagement with international equipment suppliers. Australia should adopt international standards on hydrogen unless there is a specific regional difference that applies.

We agree with participants in the consultations to date who have noted that ‘international markets do not always differentiate between Australian jurisdictions and companies’.⁸ We support a ‘Team Hydrogen Australia’ approach to engagement.

Overall, HMA is keen to play an active role in assisting government and regulators to develop meaningful regulatory approaches that work across sectors and across jurisdictional boundaries. We are in the unique position of working across different uses of hydrogen and with companies of all sizes through the hydrogen value chain.

Network and generation planning

The distribution of hydrogen production, like renewable energy and battery storage, will remain unclear while technologies and business models evolve. However, it should still be an early consideration in network and generation planning, even while at a small scale.

We note that the Working Group has ‘identified a key risk to be poor asset placement and planning, and the main barrier to be enabling market frameworks’.⁹ We agree, and believe that planning should be conducted on a national basis to avoid industry sectors and state agencies developing individual codes and standards that may not be in the best interest of Australia as a whole. Hydrogen production, location and transportation (and natural gas for that matter) should form part of the Integrated System Plan developed by AEMO and other stakeholders. Perhaps AEMO’s Integrated System Plan could be enhanced to identify not only ‘renewable energy zones’ but also preferred ‘electricity load centres’.

There is also a need to effectively leverage existing infrastructure. We agree with views put to the Working Group that suggest co-utilisation of infrastructure could provide advantages, including minimising losses and allowing ramp-up of production when demand increases.

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⁸ Issues Paper 3, p.7.

⁹ Issues Paper 7, p. 5.

Factors for consideration include ease of access to:

- electricity generation;
- water supply (preferably waste, recycled, unused natural);
- electricity networks;
- gas pipelines; and
- road/rail links to suitable ports for export of hydrogen to key international markets such as Japan and Korea.

We note that the Working Group is currently undertaking analysis of hydrogen production zones to ‘help improve information needed for optimal siting’¹⁰ and we support this activity.

Hydrogen certification

HMA supports the view of the Working Group that guarantee of origin and associated certification are critically important for the development of a credible, valuable and differentiated hydrogen market. Lack of such a scheme could lead to loss of consumer and political support, with behaviours associated with ‘greenwashing’ or scepticism associated with trading of international carbon credits undermining the development of the industry.

In the absence of an established international trading market for hydrogen, there are few reference models to draw on. An opportunity exists to develop a benchmark approach for global adoption. The credentials of hydrogen produced can be described by several parameters as identified by the Working Group in Issues Paper 4. The most critical one is emissions; however, more sophisticated buyers over time are likely to require greater transparency than simply a threshold value.

Given that the largest hydrogen market opportunity for Australia is export, it is reasonable to assume that international buyers will have sophisticated certification expectations and any scheme should be designed with the long-term requirements in mind. We believe that a scheme should be designed with sufficient granularity to scope 1 and scope 2 emissions, consistent with IPCC guidelines, and that the resultant hydrogen produced should be mutually recognised against other schemes (such as CertifHy) to ensure international consistency. Domestic markets may accept simplified ‘tiered’ (threshold) emissions, but more granular calculation facilitates subsequent labelling in any way most suitable to that market.

We support the Working Group’s view that such a scheme be promoted through international agreements in support of transparent international trade. Australian government recognition of CertifHy labelling would also act to demonstrate Australia’s role in promoting the establishment of international trade in hydrogen.

HMA has established a Hydrogen Accreditation Scheme subcommittee which has made some preliminary investigations into a possible scheme design. We are in the process of articulating design criteria for the short and medium term and are keen to share this thinking with the Working Group.

¹⁰ Issues Paper 7, p. 6.