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ENERGY RESOURCES
AUSTRALIA

Creating connections for growth



ESTABLISHING A NATIONAL HYDROGEN CLUSTER

STAKEHOLDER CONSULTATION SUMMARY

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Australia's National Hydrogen Strategy (NHS)¹ supports NERA to lead the establishment of a national hydrogen cluster to help build capabilities and drive industry collaboration across the hydrogen value chain and maximise economic benefits by ensuring Australian companies are well placed to supply new technology, products and services to domestic and international markets.²

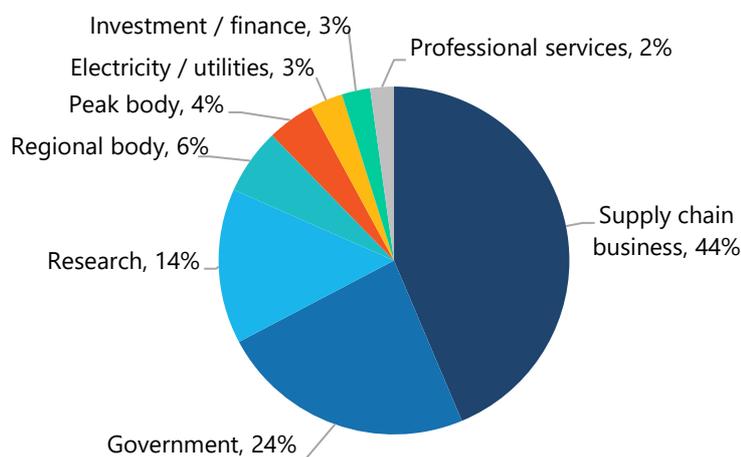
In February and March 2020, NERA consulted with key stakeholders from across Australia's hydrogen ecosystem to inform the development of a national hydrogen cluster. Consultation consisted of facilitated workshops aimed to:

- Gauge interest in a national hydrogen cluster
- Define the focus of the national cluster
- Discuss the market and technology barriers and enablers
- Identify the collaboration opportunities for the cluster

A total of 241 professionals participated across all States and Territories, with workshops held in Melbourne, Hobart, Brisbane, Townsville, Gladstone, Darwin, Adelaide, Sydney, Newcastle, Canberra and Perth.

Supply chain businesses made up 44 per cent of participants followed by government departments (Federal and State) at 24 per cent and representation from industry organisations, research institutions, regional bodies, energy and utilities providers, financiers and professional services firms.

Figure 1. Workshop participation by stakeholder industry/organisation type (see figure 1).



The two-hour consultation sessions followed a structured format to ensure consistency of information provided and participants were invited to complete a data capture form after attending the workshop, providing a further opportunity to contribute feedback and insights.

¹ COAG Energy Council, 'Australia's National Hydrogen Strategy,' November 2019. [Online]. Available: <https://www.industry.gov.au/sites/default/files/2019-11/australias-national-hydrogen-strategy.pdf>



CONSULTATION SUMMARY

The consultation process identified stakeholder preferences for scope of the national hydrogen cluster as well as key considerations for development of Australia's hydrogen industry more broadly. NERA acknowledges that many of the broad industry considerations identified through the process (and discussed hereafter) are being addressed through the NHS, relevant government agencies and peak industry bodies, with the national cluster's role centring on driving coordination and collaboration across the hydrogen value chain.

Workshop participants expressed significant interest in the formation of a national hydrogen cluster. Stakeholders identified that the nation's hydrogen landscape is currently fragmented, though reported a strong desire to connect, share information and collaborate to address major technology and market challenges. The workshop series resulted in a significant number of individuals and organisations making contact; an excellent starting point for the cluster to consolidate the hydrogen community.

Proposed cluster priorities include gaining full visibility of the national hydrogen landscape and current activities, growing market demand and the domestic supply chain, identifying the roles and responsibilities of various participating bodies, and gaining government commitment to regulatory change. A high-level summary of the consultation feedback is provided below:

Cluster Focus

Technology agnostic with a focus on decarbonisation

Feedback supported a technology agnostic hydrogen cluster that supports decarbonising the Australian economy. Differences were evident in relation to source, with some stakeholders suggesting a focus on hydrogen from renewable energy, while others believed decisions on hydrogen source should be driven by demand from Australia's trading partners along with price factors.

Focus areas for decarbonisation varied across workshops and were largely reflective of regional differences in hydrogen applications, capability, infrastructure, and geography. Examples include:

- Strong advocacy for green hydrogen in Tasmania
- Displacement of diesel raised as a short-term focus in Brisbane, Newcastle and the Northern Territory
- Offsetting natural gas as a potential mid-term opportunity in Brisbane
- Decarbonising ammonia as a potential short-term focus for Sydney

The cluster should support both domestic and international opportunities

Differences were evident with respect to market and regional priorities, with some stakeholders advocating for the pursuit of domestic opportunities, while others viewed exports as the priority. On balance, most agreed that growing both domestic and export industries would unlock regional and local opportunities, building capability, commercial depth and understanding in the economy.

Domestic market formation was commonly raised as a pivotal early stage priority for the cluster and key to building strong foundations to underpin Australia's export market in the mid-to-long term. Market



development priorities raised by stakeholders include building local demand for hydrogen technology to catalyse market formation, supporting skills development, and building social licence for hydrogen as a safe and economical energy resource for Australia.

The consultation identified an opportunity for the proposed cluster to collaborate with national and international organisations to unlock domestic and international opportunities for Australian businesses. Stakeholders noted the important role that the national hydrogen cluster will play in establishing a global identity and recognised brand for Australian hydrogen technology and expertise by coordinating efforts across the country under a single banner.

The cluster will leverage regional strengths and advantages

Stakeholders highlighted the importance of delivering local benefits and doing what is best for their respective regions. The consensus was that the proposed cluster should act as a connector and conduit for Australia's hydrogen ecosystem, working with existing and emerging state groups and regional hubs, and supporting regions to work to areas of advantage. Even in a collaborative environment, it was noted that there are benefits to leveraging local place-based advantages and niche expertise, which can be elevated to the common level through the proposed national cluster. Participants across multiple workshops suggested that regional hydrogen *Centres of Excellence* could be established to cultivate existing specialist capability at a local level.

Barriers and enablers

The hydrogen landscape is fragmented and greater visibility is needed

While some participants were very familiar with the emerging hydrogen landscape, most did not have visibility of the plethora of emerging organisations, their purpose, capabilities, and current activities (e.g. technology development, pilot projects, trials, standards development and regulations). Most workshop participants had not previously crossed paths, and consequently the sessions provided considerable networking benefits; with exception of Hobart, where participants were mostly familiar with each other and the workshop spurred the idea to develop an immediate cluster - now in operation. The consultation also identified limited familiarity among stakeholders with organisations undertaking key actions outlined in the NHS.

Clarity and visibility of the hydrogen landscape was noted by stakeholders as a key enabler to understanding local capability with the effect of reducing regional silos. Mapping the hydrogen ecosystem allows for a more coordinated approach to accelerate supply chain development, facilitate connections between regional hubs, and reduce risks of overlaps and gaps in the development, deployment, and commercialisation of new hydrogen technologies.

Intervention is needed to support knowledge sharing and collaboration

Consistent with a fragmented hydrogen landscape, stakeholders reported a lack of knowledge sharing and difficulties accessing information relating to technology and demonstrations (domestic and international); learnings from taxpayer funded/pre-competitive stage activities; capability and education;



supply and value chains; and standards. It was widely acknowledged that information sharing is central to the development of hydrogen supply chains and a high degree of collaboration is required between all parties – government, industry organisations, SMEs, entrepreneurs, academia and other interested parties.

Australian taxpayers – through ARENA, CEFC and state governments – have spent a significant quantum of funds exploring the potential of hydrogen. However, feasibility studies and demonstration pilots have not yet shifted national policy to activate market opportunities and workshop participants were unclear how funded projects have built capacity in the Australian hydrogen supply chain.

The proposed cluster could help to foster a culture of collaboration and knowledge sharing through establishing clear and consistent protocols for IP and information sharing.

Market demand and policy support is needed

There was consistent recognition across workshops that market demand is vital to support a hydrogen industry. Whilst most states and territories have expressed a desire to support the emergence of a hydrogen industry and some investing in feasibility studies and demonstration projects, none have produced a definitive policy to establish hydrogen as the future fuel of choice. Stakeholders expressed frustration around a perceived lack of clarity and government commitment that is creating industrial uncertainty, slow or no investment, and some confusion.

There was considerable discussion on what could create demand in the Australia domestic market, however, there was also a pragmatic view that there was insufficient knowledge for organisations to respond. Most stakeholders suggested it was the responsibility of governments (both Federal and State) to create the demand or support the creation of demand in pre-competitive stages of the emerging sector. Stakeholders suggested that the proposed cluster could support the interpretation and uptake of policies as they emerge and provide feedback on the prioritisation of policies to unlock economic value.

Skills development is important and the cluster could support capability building initiatives

Workshop participants recognised the importance of capability building to support the development of the emerging hydrogen industry, though there was no consensus as to how this should occur in practice. Discussions varied from individuals interested in rapid implementation of professional development training to improve knowledge and understanding of the hydrogen industry, to organisational uncertainty around investing in the development of employees, and registered training organisations trying to prepare for a future that may or may not emerge.

The discussion did not produce a well-defined forward pathway, though identified that the proposed cluster could support initiatives such as early professional development and education courses, micro credentials, technical forums, and traineeships.

Communication will be key to social acceptance of hydrogen

Stakeholders acknowledged that widespread acceptance of hydrogen energy has not yet been achieved in Australia. Existing barriers to social licence include community concerns about the safety of hydrogen



based on historical disasters (E.g. Hindenburg disaster); limited understanding of hydrogen and its applications; and concern about the use of scarce water resources in hydrogen production.

Socialisation for securing acceptance of hydrogen as an energy resource in Australia would include educating the community and industry on hydrogen applications, safety, environmental and economic benefits, and job creation. Stakeholders identified the need to educate political leaders about the current landscape and what is required to activate Australia's hydrogen opportunity. In relation to concerns around the use of water, particularly water allocation and environmental damage related to desalination, it was suggested that the cluster could elevate these concerns to the relevant policy stakeholders.

Understanding the Cluster Business Model

The general observation from the workshops was that whilst all expressed an interest in working together, most attendees were not familiar with the cluster business model and how it operates in practice. A sustained communication strategy is required to inform those that are unfamiliar with clusters to enhance understanding and engagement. Coupled with this, clear economic and collaboration principles must be established to ensure the benefits of the cluster model are fully realised.

Learning from the oil and gas sector to accelerate development of the local hydrogen supply chain

Across workshops it was commonly noted that the nascent hydrogen industry could leverage a multitude of benefits and opportunities from Australia's oil and gas sector. Stakeholders suggested an examination of the LNG sector to identify learning opportunities and transferable elements that may be applied to accelerate the development of the local hydrogen supply chain. For example, stakeholders noted the possibility to leverage infrastructure, existing capability, process technologies, safety principles, trade relationships and partnerships.

ACTIONS AND PROGRESS TO-DATE

Improving visibility of the hydrogen landscape and distribution of knowledge

A fragmented landscape and limited coordination within the hydrogen ecosystem stand as primary barriers to industry development. Consultation identified that this trend was present across all regions.

Following the consultation series, NERA partnered with CSIRO and Future Fuels CRC to develop an online hydrogen knowledge sharing platform – *HyResource* – to increase visibility of the landscape, showcase technology and capability and provide opportunities for collaboration.

Launched in October 2020, HyResource is an easy-to-navigate platform enabling decision makers and stakeholders more broadly to access core hydrogen-related information around projects, policies and key organisations involved in the research, development and deployment of clean hydrogen as a low-emissions energy source.

HyResource features large-scale, demonstration and pilot hydrogen projects across Australia and New Zealand, as well as significant hydrogen-related R&D activities arising from major research funding programs in Australia.



The platform is predicted to reduce search costs for hydrogen-related projects, enhance local and global connectivity, fill stakeholder knowledge gaps and help accelerate the development and deployment of clean hydrogen as a low-emissions energy source. Access HyResource [here](#).

Applying a regional approach to the formation of a national hydrogen cluster

Based on the feedback received through the consultation process, NERA recognised that an initial bottom-up approach is required to establish a successful national hydrogen technology cluster. Through developing regional clusters around key hydrogen projects and potential hubs, or in regions that will service those hubs, we will help to enhance local cohesion and capability in the hydrogen value chain.

NERA launched the Regional Hydrogen Technology Clusters Seed Funding Program in September to support the formation of a network of hydrogen technology clusters around Australia. NERA is providing seed funding of up to \$100,000 for successful applicants to form hydrogen technology clusters that will accelerate and optimise the development of hydrogen technology and expertise across the country.

The EOI application process closed on 14 October and NERA received a considerable number of competitive submissions from individual organisations and consortia spanning all states and territories. The evaluation and selection process is underway and the successful regional clusters will be announced in December 2020.

Once established, this network of hydrogen clusters will play a central role in connecting to establish the national hydrogen cluster – which is proposed to operate as a virtual network. The national hydrogen cluster aims to establish a global identity and a recognised brand for Australian hydrogen technology and expertise, accelerate hydrogen supply chain development, and reduce overlaps and identify gaps in the development, deployment, and commercialisation of new technologies.

Further information about the Regional Hydrogen Technology Clusters Seed Funding Program can be found [here](#).



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