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**Hydrogen Strategy Taskforce**

**Resources Division**

**Department of Industry, Innovation and Science**

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**28 March 2019**

**National Hydrogen Strategy – Discussion Paper**

AGL Energy (**AGL**) welcomes the opportunity to make a submission in response to the Hydrogen Strategy Taskforce's National Hydrogen Strategy Discussion Paper (**Discussion Paper**) released on 1 March 2019.

AGL is one of Australia's largest integrated energy companies and the largest ASX listed owner, operator and developer of renewable generation. Our diverse power generation portfolio includes base, peaking and intermediate generation plants, spread across traditional thermal generation as well as renewable sources. AGL is also a significant retailer of energy, providing energy solutions to around 3.5 million customers throughout eastern Australia.

In addition, AGL is continually innovating our suite of distributed energy services and solutions for customers of all sizes. These behind-the-meter energy solutions involve new and emerging technologies such as energy storage, electric vehicles, solar PV systems, digital meters, and home energy management services delivered through digital applications.

The commitment by the COAG Energy Council in December 2018 to establish a dedicated working group, chaired by the Chief Scientist Dr Alan Finkel, is a welcome step in progressing the development of a clean, innovative, and competitive hydrogen industry that may create significant opportunities to further integrate energy markets with emissions reduction obligations, provide alternative energy sources for customers, and provide significant value to Australia's economy through both export revenue, domestic industrial development and mobility fuels.

The benefits of hydrogen as a fuel source are clear if they can be realised at low cost. Hydrogen is universally abundant, and when used as a fuel source produces no environmentally harmful emissions. However, while technologies to isolate hydrogen has been available for a considerable period of time, the cost to do so has not yet proven competitive against other energy sources.

The Hydrogen Strategy Group's briefing paper *Hydrogen for Australia's Future*, presented to the COAG Energy Council in August 2018, and the CSIRO's *National Hydrogen Roadmap* provide useful overviews of these issues along with the current status of hydrogen production technologies and the challenges and opportunities associated with expanding this production in Australia.



As a participant in the Hydrogen Energy Supply Chain (**HESC**) project, AGL is already well aware of these technical and operational challenges, and advanced in its consideration of the value of developing a hydrogen supply chain.

The HESC project is a world-first initiative where brown coal from the AGL Loy Yang mine will be converted to gaseous hydrogen at the Loy Yang Complex and then transported by road to a liquefaction terminal at the Port of Hastings. The gas will then be shipped to Japan for use predominantly in the transport industry.<sup>1</sup> AGL's support for the pilot project includes land, energy and water for the plant and up to 160 tonnes of brown coal. With support from the Australian, Japanese, and Victorian governments, the HESC Project includes leading Japanese energy and heavy industries corporations including Kawasaki Heavy Industries, J-Power, Iwatani, and Marubeni Corporation.

During commercial operations, HESC will require a Carbon Capture Utilisation and Storage (**CCUS**) solution. CCUS will not be a feature of the HESC pilot phase, due to the low volumes of carbon dioxide involved, which is equivalent to the annual emissions of about 20 cars. Carbon offsets will instead be used to mitigate emissions for the pilot phase. However, if the pilot is successful, CCUS will be an essential component of the commercial phase, a factor which has been recognised by both the CSIRO and Hydrogen Strategy Taskforce's discussion papers.

While AGL is involved in the production of hydrogen from brown coal, we are also interested in how hydrogen could support existing electricity and natural gas markets and assist in meeting Australia's international commitments to reduce emissions. As noted by the *Hydrogen for Australia's Future* briefing paper, electricity requirements for hydrogen production from electrolysis could provide a useful level of demand for low-cost generation that is not being dispatched into the grid. We look forward to working with the group to expand the knowledge regarding opportunities in this sector.

Similarly, we note the initial discussions regarding the replacement of natural gas with hydrogen in the existing gas supply chain. In our view, the partial replacement of the existing natural gas supply chain with hydrogen may be an effective way in both introducing additional gas supply and reducing emission, but we consider that more work needs to occur to understand the full costs and implications of such a concept.

Even so, we consider that the value of these opportunities to the Australian economy and energy security are considerable and therefore worth exploring in some detail. We therefore look forward to continuing to work with the Hydrogen Strategy Taskforce to further develop and inform the direction of the roadmap.

We have provided responses to the specific questions posed by the Department in the body following this letter.

Should you have any questions in relation to this submission, please contact Aleks Smits, Manager Policy & Research on 03 8633 7146, or myself on 03 8633 7252.

Yours sincerely,

A handwritten signature in blue ink, appearing to read 'Eleanor McCracken-Hewson', written over a light blue horizontal line.

**Eleanor McCracken-Hewson**

Senior Manager Policy, Research & Stakeholder Engagement, AGL Energy

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<sup>1</sup> For more information on the HESC project, see <https://hydrogenenergysupplychain.com/>



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## **Key Policy Questions**

### **What do you think are the two or three most significant developments in hydrogen?**

Internationally, Japan and Korea's plans to realise a Hydrogen Society so as to meet their Paris Climate Targets have prompted and fostered significant government and private sector research into the creation and utilisation of hydrogen. These developments extend, but are not limited to, the following:

- Fuel cell development and utilisation
- Hydrogen to power or power to Hydrogen
- Hydrogen transport and liberation (within ammonia or in a condensed phase)
- Mobility solutions

Domestically, AGL is proud to be partnering with KHI, JPower, Iwatani, Marubeni, the Australian Commonwealth and Victorian Governments to pilot the world first Hydrogen Energy Supply Chain. The project has the potential to realise hydrogen production at a scale that is likely to be competitive to alternative sources. Whilst the consortium acknowledges the need for Carbon Capture Utilisation and Storage (CCUS) during a commercial phase, projects like HESC offer, at scale, immediate air emission reductions and are likely to be materially important to a future hydrogen industry, and meeting climate policy objectives.

### **What are the most important safety issues to consider in producing handling and using hydrogen in Australia?**

Safety considerations by gas facilities are generally well managed, however within Australia the absence of specific, suitable and complete hydrogen Standards are likely to hold the development of the industry back.

By way of example, the introduction of alternate fuels (such as phasing out of lead-based petroleum, or the introduction of ethanol blends or LPG) required concerted research, the development of Standards and their application within multiple industrial and transport sectors.

AGL urges the Department to focus on the development of appropriate regulation and Australian, but ideally, International Standards to support the development of a complete supply chain of safe generation, transport, handling and utilisation of hydrogen and management of associated waste streams.

### **What environmental and community impacts should we examine?**

AGL believes that safety and environmental impacts should be a primary consideration when considering the manufacturing and utilisation of hydrogen. Our communities should feel confident and comfortable with hydrogen generation, storage, transport and utilisation.

Again, AGL urges the Commonwealth to work with industry leaders to develop appropriate regulation and Australian, and ideally International, Standards to support the complete supply chain of safe generation, transport, handling and utilisation of hydrogen and associated by-product streams.

### **How can Australia influence and accelerate the development of a global market for hydrogen?**



For Australia to capitalise on a global hydrogen market it must either develop cost effective hydrogen technologies (generation, transport, handling or utilisation) for export and/or facilitate or develop suitable marine hydrogen transport.

Hydrogen may be a similar development pathway to LNG in the late 1970s and 1980s. Technological advancements in the shipping of LNG unlocked the commodity to become a truly global energy commodity. Ocean-going transportation of hydrogen therefore remains an outstanding issue to consider for the acceleration of a global hydrogen market.

### **What are the top two or three factors required for a successful hydrogen export industry?**

AGL believe that confidence in the cost, safety, reliability, and availability of supply are required for a successful industry:

- Costs must be equal to or better than substitute fuels.
- Hydrogen and associated waste products must be produced, stored, transported and utilised in a safe manner.
- Hydrogen must be available in volumes that enable it to underpin its role within an export industry.

### **What are the top two or three opportunities for the use of clean hydrogen in Australia?**

There are many opportunities for the use of clean hydrogen within Australia. Whilst the term “clean hydrogen” is yet to be formally defined AGL interprets this a CO<sub>2</sub> free or CO<sub>2</sub> managed hydrogen. Whilst the industry is in its infancy, AGL believes there is medium-term potential for hydrogen in areas including the following:

- As a supplementary de-carbonising gas within the national gas grid;
- Within the transport sector (Hydrogen Fuel Cell Vehicles)
- As an energy storage solution for time lapsed distribution; and/or
- Large industrial users may have an interest in the direct sale of hydrogen (as a feedstock), rather than current supplies being blended with natural gas.

### **What are some examples where a strategic national approach could lower costs and shorten timelines for developing a clean hydrogen industry?**

Whilst there are many lessons to be learned from the development and implementation of past national and state approaches including though not limited to approaches for transport fuel replacements and the Renewable Energy Target, AGL believes that a national approach to funding and promotion of such a scheme, supported by COAG, is essential to the development of this industry. A clear, unambiguous and nationwide policy has the potential to achieve reduced costs and timelines for developing the industry by:

- Pooling R&D resources
- Facilitating development of safety and technical standards
- Supporting alignment of incentives and trajectories of technology and business model development.

### **What workforce skills will need to be developed to support a growing clean hydrogen industry?**



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Hydrogen, as an energy carrier, has the potential to append to, disrupt and/or change Australia's energy and mobility sectors. As a result AGL considers that elements of our secondary and tertiary educational curriculum need to reflect this diversification/disruption potential within the traditional frameworks. AGL envisions that Australia's workforce would need to develop skills along the hydrogen value chain, including generation, transportation, exports and end use facilities (including upgrading appliances or infrastructure, and educating users).