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Australian Energy Market Operator
Via email forecasting.planning@aemo.com.au

To whom it may concern,

Draft 2021 Inputs, Assumptions and Scenarios Report – Draft report for consultation

Australian Gas Infrastructure Group (AGIG) welcomes the opportunity to make this submission on AEMO's *Draft 2021 Inputs, Assumptions and Scenarios Report* (Draft IASR).

In particular, we focus on aspects relating to hydrogen modelling which will be an increasingly important element of AEMO's work, including in the 2022 Integrated System Plan. At AGIG we are taking a leading role in the deployment of renewable hydrogen technologies and the development of Australia's hydrogen industry. We therefore look forward to continuing and increasing our engagement with AEMO on these issues.

Outside of this consultation, AEMO will play a key role in ensuring gas markets are well placed to enable blending of renewable gases, including hydrogen, into distribution networks. Gas market rules and procedures are not well suited to demonstrating and deploying hydrogen technologies, and AEMO will play an important role in making markets and the regulatory framework suitable.

About AGIG

AGIG is the largest gas distribution business in Australia, serving more than two million customers through our networks in Queensland, South Australia, Victoria, and several regional networks in New South Wales and the Northern Territory.

At AGIG, we are committed to sustainable gas delivery today, and tomorrow. In 2017 we worked with Australia's five peak gas bodies to develop Gas Vision 2050 – a pathway to achieve near zero emissions in our gas sector. We are now delivering on this Vision by deploying low carbon gas projects. Our projects include:

- Hydrogen Park South Australia (HyP SA) – A 1.25MW electrolyser to produce renewable hydrogen for blending with natural gas (up to 5%) and supply to more than 700 existing homes and businesses in metropolitan Adelaide. First production is expected by around April this year.
- Hydrogen Park Gladstone (HyP Gladstone) – A 175kW electrolyser to produce renewable hydrogen for blending with natural gas (up to 10%) and supply to the entire network of Gladstone, including industry. First production is expected in 2022.
- The Australian Hydrogen Centre (AHC) – A virtual centre delivering feasibility studies for 10% blending and 100% renewable hydrogen in towns and cities in South Australia and Victoria.
- Hydrogen Park Murray Valley (HyP Murray Valley) proposal – A 10MW elctrolyser to produce renewable hydrogen for blending with natural gas (up to 10%) and supply the twin cities of Wodonga (Victoria) and Albury (NSW), with the potential to supply industry and transport sectors.

Section 2.3 - Export Superpower scenario

We support AEMO's assumption in the Export Superpower scenario that early domestic uptake of hydrogen facilitates export growth, by deploying electrolysers at scale, lowering costs (particularly

balance of plant costs), developing electricity and gas market services, and building local capability. This domestic deployment will allow for the large and rapid development of hydrogen for export as the international market develops.

However, we consider that AEMO should also recognise that a strong domestic uptake of hydrogen can occur without it being driven by an export market and will have implications for domestic electricity and gas markets. In drawing conclusions from the scenarios and subsequent analysis, we believe AEMO should recognise that elements of this scenario will be useful even in the absence of hydrogen exports. Indeed, the domestic deployment of hydrogen at scale will be required to achieve carbon reduction ambitions.

For example, the projects outlined above are already considering offering services to the electricity market, particularly frequency control and ancillary services. These services help improve hydrogen and renewable electricity project economics and therefore offer benefits to both the gas and electricity markets. While these projects are small in scale and unlikely to make a material difference for the IASR, we expect the size and number of electrolysers connected to the NEM to increase rapidly (in much the same way as occurred for renewable electricity).

The current drivers for hydrogen in the domestic market largely reflect Australia's effort to reduce emissions at lowest cost, for hard to abate sectors like industries that have no alternative but to use gas, and to improve energy security. These goals are reflected by the various decarbonisation commitments and targets adopted and we see these drivers continuing in the foreseeable future.

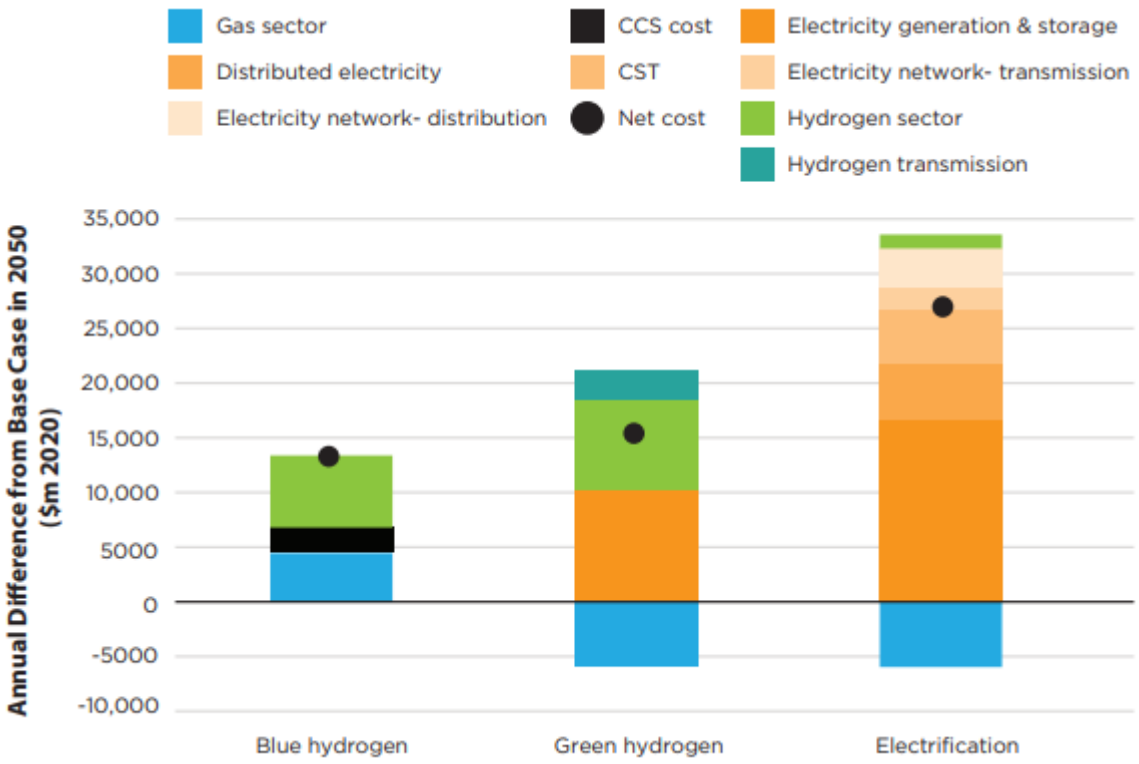
For some states, like Victoria, the role of hydrogen is expected to be particularly important as natural gas comprises a significant portion of the state's energy consumption, particularly in providing winter heat. The Grattan Institute found that "Victoria's large household winter gas heating load means that switching small-user gas loads would have significant effects on its electricity system" and that switching to electricity would increase emissions over the next decade.[1]

Further, hydrogen represents the least cost pathway to achieving emissions reductions from natural gas. Growing evidence shows that hydrogen is a cost-effective way to achieve zero emissions in replacing existing uses of natural gas. A recent analysis by Frontier Economics determined that an "Electrification" scenario, whereby almost all end-use natural gas consumption is replaced by electricity supply, is the costliest approach to reach net zero emissions from the stationary energy sector by 2050, while hydrogen is significantly lower cost.[2]

Figure 1 illustrates that a decarbonisation strategy that utilises existing gas infrastructure will be significantly cheaper than the full Electrification scenario. These results, for Australia as a whole, are even stronger in Victoria, where renewable hydrogen blended into distribution networks is a significantly cheaper replacement than electrification because of electricity network augmentation and storage requirements.

[1] Grattan Institute, Flame out, the future of natural gas, November 2020, p.47
[2] Frontier Economics, The benefits of gas infrastructure to decarbonise Australia, 17 September 2020

Figure 1: Net cost of decarbonising gas by scenario



Source: Gas Vision 2050, p.8

The Frontier Economics work produced similar results to an analysis previously undertaken by Deloitte and AGIG. This work similarly found that decarbonisation of the gas sector through adoption of hydrogen technology would be 40% less than full electrification and decommissioning of the gas sector.

Importantly, this analytical work is yet to quantify the potential benefits to electricity markets of grid connected electrolysers in the form of FCAS, demand management and storage. Projects like HyP SA and HyP Murray Valley will help to demonstrate the potential value of these services for hydrogen production, renewable electricity generation and electricity markets.

Hydrogen powered vehicles

We consider that the uptake of EVs (based on batteries) will be affected by competition with hydrogen-powered vehicles, particularly over long distances where the size and costs of EV batteries makes them potentially less efficient. The IASP should consider the role of passenger and long-distance heavy haulage transport, the production of hydrogen to meet this demand, and the implications of the electricity network.

Contracting assumptions

The Export Superpower scenario should consider that some industries are contracting for hydrogen given that this is what is currently occurring. We have recently signed an agreement with BOC Ltd to install tube trailer refilling infrastructure at the Hyp SA plant. BOC plans to supply industrial customers in Whyalla and Adelaide with hydrogen output from HyP SA. The new Adelaide-based hydrogen supply chain will replace current tube trailer hydrogen deliveries to Whyalla from Victoria, saving

approximately 117,000km in annual driving and 122,000 kilograms of carbon emissions per year.[3] These types of contracting arrangements may reflect alternative markets for hydrogen, produced near to and often stored within gas distribution networks, and could form a significant part of demand where it is uneconomic to access hydrogen via a gas distribution network.

Section 4.3.1 – State-based emissions targets

We consider that AEMO should also reflect state-based emission targets for the Central scenario of net zero-carbon by no later than 2050 adopted by every Australian state and territory. These targets go beyond the Australian Government's commitment to reducing emissions by 26-to-28% below 2005 levels by 2030, in some cases are legislated obligations (in Victoria and the ACT).

Section 4.14 – Hydrogen modelling

As noted above, we consider that AEMO's approach in only modelling grid-connected hydrogen in the Export Superpower scenario may not provide significant coverage. The assumption in other scenarios that hydrogen is expected to be either insignificant or produced off-grid does not reflect current activities to produce and blend hydrogen, which in many cases is driven by domestic emissions reduction targets, with potential to expand into export. As discussed in our response to section 2.3 above, there are broader opportunities for hydrogen in the domestic market which could be reflected in other proposed scenarios.

In terms of the assumptions on hydrogen supply and infrastructure, we consider the assumptions are broadly reasonable but we note these assumptions are likely to quickly change as the industry develops and services are offered to customers by AGIG's projects and others. Therefore these assumptions should be regularly reviewed and updated. The growth and development of renewable electricity sector would form a reasonable guide for the hydrogen sector.

Once again, I would like to thank you for the opportunity to provide a submission on the IASR. Should you have any queries about the information provided in this letter please contact Drew Pearman, Manager Policy and Government Relations (drew.pearman@agig.com.au or 0417 544 731).

Yours sincerely,

Craig de Laine
General Manager People and Strategy

[3] https://www.australiangasnetworks.com.au/our-business/about-us/media-releases/new-sa-hydrogen-plant-to-supply-industry#