Australian Gas Infrastructure Group

L6, 400 King William Street
Adelaide, SA 5000 Australia

PO Box 6468, Halifax Street,
SA 5000 Australia

+61 8 8227 1500

info@australiangasnetworks.com.au

australiangasnetworks.com.au

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Australian Energy Market Operator and Energy Networks Australia
info@energynetworks.com.au

To Whom It May Concern:

AEMO-ENA: Open Energy Networks Consultation

I am writing in response to the AEMO-ENA Open Energy Networks Consultation.

The consultation is an important opportunity to consider how best to manage the growing penetration of distributed energy resources. After introducing Australian Gas Infrastructure Group (AGIG), our response focuses on the AEMO-ENA objective of facilitating innovation and competition at the grid edge.

In particular, we will focus on distributed energy resources not mentioned in the consultation paper and supporting infrastructure—such as gas networks—that we believe can play a significant role in actively managing other distributed energy resources. These energy resources can address many of the concerns outlined in the paper. However, this will require all the principles included in the consultation paper—especially adaptability, minimising duplication and technology neutrality—to be appropriately incorporated into the platform and systems adopted by AEMO.

About AGIG

In 2017, Australian Gas Networks (AGN), Dampier Bunbury Pipeline (DBP) and Multinet Gas Networks (MGN) came together to form AGIG. AGIG is one of the largest gas infrastructure businesses in the country. We have approximately 2 million customers across every mainland state and the Northern Territory, 34,000km of distribution networks, over 3,500km of gas transmission pipelines, and 42 petajoules of gas storage capacity.

Given our diverse network of assets, and extensive engagement with gas users(including electricity generators), AGIG has a strong interest in improving the functioning of energy markets in Australia.

Challenges of distributed energy resources

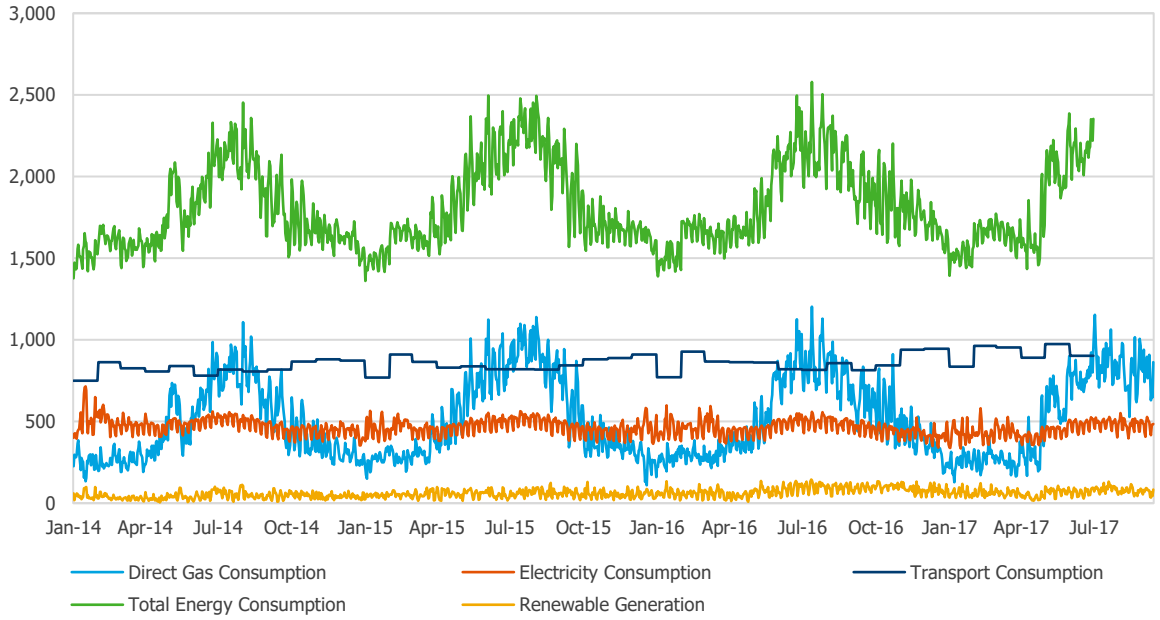
The AEMO-ENA consultation paper clearly points to the many potential impacts of distributed energy resources if they are poorly managed. These include lower quality of electricity services to customers, further constraints on customer choices, and costly and potentially unnecessary investment in network augmentation.

This latter issue is particularly important when we consider the range of technologies necessary to decarbonise the entire Australian energy sector and the overemphasis on electrification at present.

Figure 1 below shows for Victoria the energy delivered through direct gas consumption (the light blue line), electricity consumption (the orange line) and transport fuel (the dark blue line). It also shows the level of renewable electricity generation (in yellow).

The chart illustrates the scale of the challenge at hand to decarbonise all energy consumption represented by the green line. Our energy networks need to be integrated and adaptable to a range of existing and emerging technologies to address this challenge.

Figure 1: Total Energy Consumption, Victoria (TJ) [1]



At present policy and legislated targets continue to focus almost exclusively on electrification.

To meet this challenge in an efficient manner an integrated approach must be taken. Complete electrification of direct gas and transport is not a practical solution to the problem. It would require large investment in electricity generation, transmission, distribution and storage, particularly to develop active distributed energy resources needed to address the concerns outlined in the AEMO-ENA consultation paper.

We have prepared a paper (to be published online later in August) that compares the cost of two pathways: electrification of all present gas usage; versus the continued use of existing natural gas distribution networks using hydrogen produced from renewable generation and electrolysis.

The outcomes of this analysis suggest that decarbonising gas consumption in Victoria through electrification alone would cost 59 per cent more than using renewable hydrogen.[2] This is the result of additional investment required in upgrading electricity networks in the first pathway, more than the investment required to produce hydrogen using electrolysis in the second pathway. This analysis provides strong support for further developing hydrogen technologies in Australia.

The challenge for the electricity network, as identified in the AEMO-ENA paper, is to manage a wide range of both passive and active distributed energy resources. Based on the results of our analysis, we believe gas networks and emerging hydrogen technologies can be a part of this integrated approach if markets and systems are appropriately designed.

[1] NEM Review; AEMO Gas Bulletin Board; Department of Environment and Energy, Australian Petroleum Statistics. Note: Chart does not include LPG. Transport excludes aviation.

[2] This analysis considers transport fuels, but full electrification of transport would likely further add to the costs.

Significant opportunities and technologies for reducing emissions using gas networks

The gas industry is already working towards decarbonisation. *Gas Vision 2050*[3] describes the important role that gas plays today in the energy mix and describes the technologies and processes by which we will decarbonise Australia's gas supply.

Of particular interest is the potential for hydrogen—the most abundant chemical element in the universe and a clean burning fuel—to be produced through electrolysis with renewable electricity. This technology has the benefit of decarbonising both gas and electricity supply by facilitating the roll-out of renewable electricity at scale.

Deloitte Access Economics, in *Decarbonising Australia's gas distribution networks*, outlined the potential for hydrogen to play a role in addressing many of the issues outlined in the AEMO-ENA consultation paper.[4]

In particular, Deloitte suggests that distributed electrolysers, producing hydrogen through excess renewable electricity in local networks, "can complement renewable electricity generation, in effect turning an intermittent source of energy into a storable source of energy".[5] By converting renewable electricity into hydrogen, we can store energy in the existing gas network and improve the stability of electricity networks.

Consistent with this vision, we are delivering a project to build Australia's largest Polymer Electrolyte Membrane (PEM) electrolyser at the Tonsley Innovation District in South Australia—Hydrogen Park South Australia (HyP SA).

This power-to-gas plant has a number of key benefits, which include:

- decarbonising gas supply to directly contribute to emissions reduction targets by utilising existing, reliable and affordable gas network infrastructure;
- connecting the electrolyser to adjacent onsite solar generation; and
- integrating gas and electricity networks with a view to increasing electricity network stability by providing a demand for excess renewables from the grid.

Through this work it is clear that gas infrastructure will play a key role in addressing the challenges of distributed energy resources.

System requirements for distributed energy resources

In support of a role for gas networks and hydrogen, it is important that system and market design be adaptable to existing as well as emerging distributed energy resources. Three principles for system design outlined in the consultation paper seem particularly important in this regard:

- simplicity, transparency and adaptability of the system to new technologies;
- minimising duplication of functionality where possible and utilising existing governance structures without limiting innovation; and
- promoting competition in the provision and aggregation of DER, technology neutrality and reducing barriers to entry across the National Energy Market (NEM) and Western Energy Market (WEM).

These principles suggest that AEMO-ENA should ensure system design allows for the significant role that hydrogen can play. This includes a role in supporting greater levels of renewable energy investment and in integrating the electricity grid with the wider energy market.

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[3] The strategy outlined in Gas Vision 2050 outlines the complementary role gas can play in decarbonising energy. Gas Vision 2050 is a key document released by all parts of the gas supply chain (from gas exploration and production, to transmission and distribution networks, to gas appliance manufacturers).

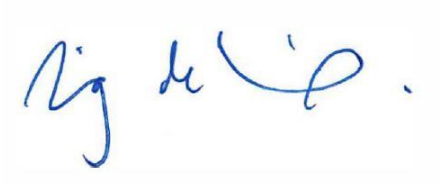
[4] See https://www.energynetworks.com.au/sites/default/files/054496_tg_decarbonising_australias_gas_network_final.pdf

[5] See https://www.energynetworks.com.au/sites/default/files/054496_tg_decarbonising_australias_gas_network_final.pdf

As our own work in HyP SA progresses we would be happy to share our experiences so as to better understand how we can utilise existing gas networks and hydrogen production as part of an integrated network of distributed energy resources. We will also share our paper comparing the costs of electrification and renewable hydrogen with AEMO and ENA once it is available. We therefore consider that AEMO-ENA should actively consider the role that gas networks can play to integrate increasing levels of distributed resources into the energy system.

I thank you for the opportunity to respond to the AEMO-ENA consultation paper on Open Energy Networks. Should you require any additional information please contact Drew Pearman, Manager Policy and Government Relations on 08 9223 4341 or email drew.pearman@agig.com.au.

Yours sincerely



Craig de Laine
General Manager People and Strategy