Submission No 8

INQUIRY INTO DEVELOPMENT OF A HYDROGEN INDUSTRY IN NEW SOUTH WALES

Organisation: Australian Energy Council

Date Received: 25 February 2021

AUSTRALIAN ENERGY COUNCIL

The Hon. Sam Farraway, MLC
Chair
Standing Committee on State Development
Parliament House
Macquarie St
SYDNEY NSW 2000

25th February 2021

Submitted via e-mail to: state.development@parliament.nsw.gov.au

Dear Mr Farraway,

Inquiry into the Development of a Hydrogen Industry

The Australian Energy Council (the "**Energy Council**") welcomes the opportunity to make a submission in response to the Standing Committee on State Development's *Inquiry into the Development of a Hydrogen Industry in New South Wales*.

The Energy Council is the industry body representing 21 electricity and downstream natural gas businesses operating in the competitive wholesale and retail energy markets. These businesses collectively generate the overwhelming majority of electricity in Australia, sell gas and electricity to over ten million homes and businesses, and are major investors in renewable energy generation.

Discussion

The Energy Council supports the development of the National Hydrogen Strategy,[1] and believes that government has an important role in supporting strategy, initial research & development, and the removal of regulatory barriers (in alignment with national processes).

The Energy Council sees value in hydrogen potentially being used to support electricity systems, for example as a form of storage. While initial research & development funding and removing barriers to entry is an appropriate role for government, the Energy Council also notes the risk of extended support being interpreted as energy market intervention, which would be counterproductive. Ideally the electricity market's existing signals, such as low prices at times of surplus generation, should alone encourage technology-neutral private investment in hydrogen systems, as well as other forms of storage.

The Energy Council supports electrolytic hydrogen production plants being used to absorb excess generation but notes that periods of surplus may only occur under certain conditions, such as summer afternoons, and any production facility will need to accommodate periods of production at higher prices, coinciding with lower supply availability (such as cloudy, windless days), or higher demand (such as mid-winter). There should be no unrealistic expectation that a hydrogen plant can run continuously, or near-continuously, with low prices. Although there is an expectation present in the forward contract market that average electricity prices will reduce in the future, the horizon of such forecasts is near, and there can be no certainty that any substantial reduction in average prices is likely to be sustained. Thus, to benefit from very low-priced electricity, the business case of any hydrogen plant would need to assume a flexible and short-running period profile. Furthermore, markets are generally cyclic in nature, therefore it is likely that over the lifetime of a hydrogen

[1] COAG Energy Council Hydrogen Working Group, *Australia's National Hydrogen Strategy*, 22nd November 2019

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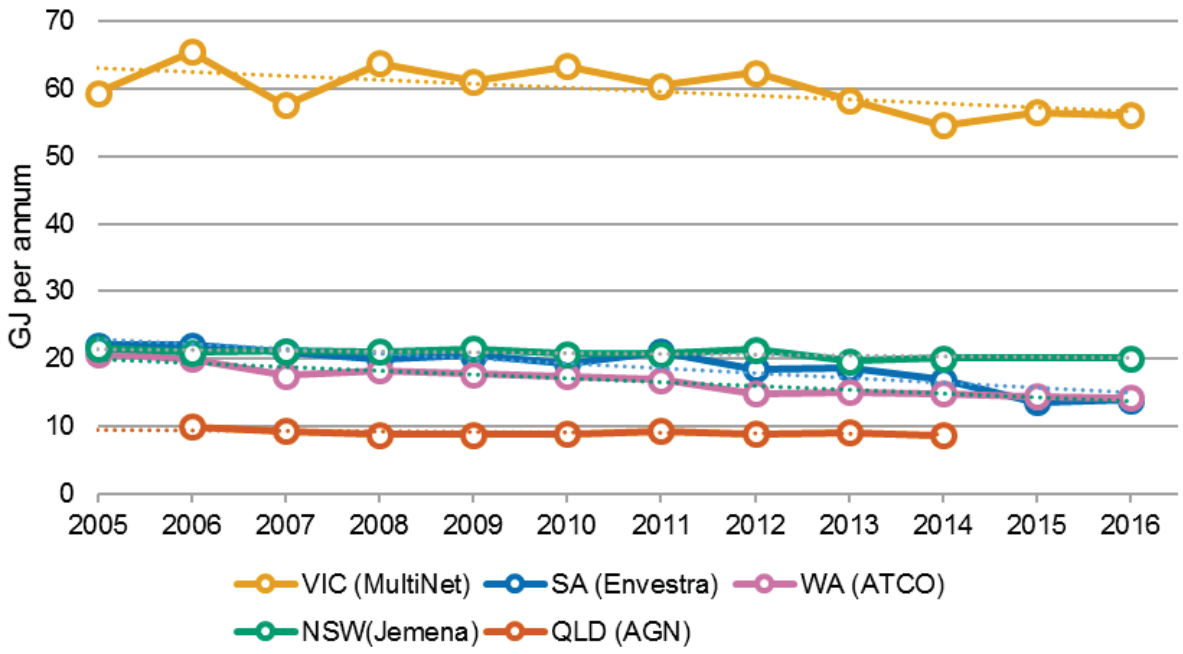
production plant it will be subject to both falling and rising prices. Its business case will need to accommodate these variations.

Fast controllability of an electrolytic plant may also provide options for selling frequency control ancillary services (FCAS), and supplying voltage control services to networks.

Once produced, the hydrogen will need to find a market. Depending upon quantities produced, the export market may be a suitable outlet. An alternative is to co-mingle the hydrogen with natural gas, although there are limitations in doing so before flame characteristics alter appliance performance, necessitating the conversion of appliances by changing burners.

The literature cited in *National Hydrogen Strategy Issues Paper 6 "Hydrogen in the Gas Network"*[2] suggests that co-mingling may be a precursor to the complete substitution of natural gas by hydrogen. Although natural gas remains an important residential fuel source, despite an increase in the number of residential connections, average household consumption is declining, as shown in the following graph.

Typical Consumption Trends of Average Household Gas Use[3]



The Australian Energy Market Operator also reports that, despite new connection growth, energy efficiency improvements and appliance fuel switching in response to projected increasing retail gas prices mean that overall residential gas consumption is declining, with expectations of only slight increases in the longer term, as shown in its forecast:

[2] Available at https://consult.industry.gov.au/national-hydrogen-strategy-taskforce/national-hydrogen-strategy-issues-papers/
[3] Oakley Greenwood, *Gas Price Trends Review*, Version 2.1 March 2018, p.160, Figure 110

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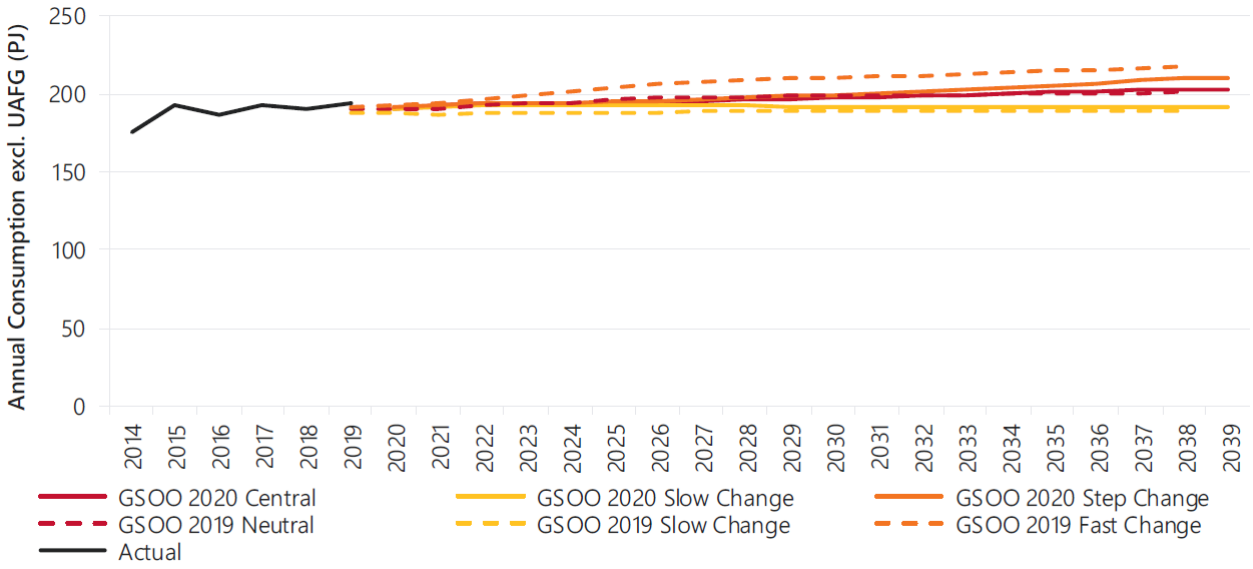
Residential/Commercial Annual Consumption Actual and Forecast, 2014-39[4]



Therefore any business case for hydrogen use in the domestic market will need to consider long-term future demand. Unless there are compelling product differences or economic benefits, the success of encouraging local hydrogen usage is not assured.

The magnitude of changing the natural gas transmission systems, distribution systems and customer appliances to hydrogen are also not to be underestimated. The Australian Gas Light Company (later AGL Gas Networks) spent 14 years from 1976 to 1990 converting more than 500,000 customers in Sydney from towns gas to natural gas.

In addition, the Energy Council notes that there are technical limitations to direct substitution, including the embrittlement of steel pipelines, meter replacement requirements, and increased unaccounted for gas. There will also be issues due to the different heating values of the fuels, with hydrogen having a higher heating value approximately one-third of natural gas' maximum of 42.3MJ/m^3.[5] While transmission and distribution pipelines are generally built with spare capacity, it is possible that the increased pipeline throughput required to transport hydrogen may lead to delivery constraints without infrastructure upgrades.

These technical issues have been outlined in a Sustainable Gas Institute & Imperial College London White Paper,[6] which recommends further research by the development of practical demonstration projects and whole-system modelling research. The Energy Council believes that more investigation is needed, and is particularly keen to stress that any technical assessment should be overlaid with rigorous cost-benefit analysis before any public funds are committed.

[4] Australian Energy Market Operator, *2020 Gas Statement of Opportunities*, March 2020, p.25, Figure 8
[5] Australian Standard AS4564-2020 *Specification for General Purpose Natural Gas*
[6] Sustainable Gas Institute & Imperial College London, *A Greener Gas Grid: What are the options?*, July 2017

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Conclusion

The Energy Council believes that there is significant opportunity for a hydrogen industry to be developed in NSW, and recommends the Committee consider actions it can undertake to support this development in a manner which is complementary to existing gas and electricity market frameworks, while ensuring distortionary effects are limited to the extent possible.

Any questions about this submission should be addressed to the writer, by e-mail to .

Yours sincerely,

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