

Appendix – Q&As

AusNet Developer Industry Briefing | The Future of Gas

Thank you for joining us at the AusNet Industry Briefing on **Future of Gas**, held **24 August 2022**.

We have prepared a list of questions and answers based on what was asked on the day, with the intent that these will clarify any questions on this topic.

Please note in some cases questions have been edited for brevity. The intent was not to change the meaning of the original question.

Several FAQs were answered during the session. Please refer to the slide pack for responses to the following questions:

- **Q:** How are developers' capital contributions calculated? Why are they so high for some developments?
- **Q:** Can the electricity network handle gas load being moved over?
- **Q:** Developing an all-electric vs dual fuel estate – what is different for developers?
 - **Q:** Will AusNet subsidise switching from dual-fuel to all-electric estates?
 - **Q:** Will AusNet provide/subsidise batteries at developments to address peak loads?

Q: Does AusNet expect bottled gas will be banned?

A: AusNet can't see any moves towards this happening at the moment. It would likely be some time off, especially if bottled gas is used only for cooking, which for the average household is responsible for a small amount of emissions compared to gas heating and hot water systems.

Q: An attendee asked about the Housing Industry Association (HIA) introduction process and whether the HIA has started the introduction process with the sole-trader builders?

A: The HIA is running an extensive seminar series on the NCC updates for its members, and you can find dates for these on the [HIA's Event's](#) page.

Q: An attendee asked over how many years AusNet calculates the cost versus revenue for capital contributions?

A: For gas, currently payment of tariffs is assumed for a 20-year period for residential. AusNet added that for electricity it is 30 years. For new estates, it is calculated from the estimated date that homes start connecting.

Q: An attendee stated that there appears to be a dichotomy between the government or consumer desire to move to full electric and how businesses like AusNet calculate customer or developer contributions.

A: Capital contributions are lower when customers use greater loads. This highlights the importance of developing renewable products, and making sure there is a renewable product to sell. AusNet highlighted that the push for electrification of gas is just another change for the electricity industry, like uptake of solar PV and electric vehicles and, at the end of the day, it will likely be what customers buy and consume that determines how the gas and electricity industries respond.

Q: An attendee asked whether the regulatory arrangements will be changed to reflect the changing gas connections and consumption profiles?

A: The ball is in networks' court, to provide the AER with updated models that are appropriate and comply with the regulations (via regulatory reviews). The models are reviewed and updated every five years via the Gas Access Arrangement Review (GAAR) process, which is currently underway. These proposals are published for

public feedback and submissions, then reviewed by the AER who makes the final decision on the regulatory arrangements.

Q: An attendee asked about the practicalities of investments required to meet the 50% reduction in gas usage by 2030, as outlined in the roadmap.

A: While this will be challenging, it is deliverable with enough notice. Building assets takes time and requires forewarning if additional assets are required.

Q: An attendee said they feel AusNet is giving the impression that there is no future for gas, and asked whether there is a plan to transition to renewable gas.

A: This is definitely not the case and the presentation from AGIG in the session detailed significant progress in the development of renewable gases. AGIG is completing considerable trials on their network in South Australia and Victoria. There is government support for this work, and what works on one distribution network will work for all networks, so AusNet doesn't need to duplicate AGIG's work.

Q: An attendee asked about the lifecycle of the gas network, and the risk of it being installed in new estates but then not used. Additionally, they wondered whether it is prudent to continue installing gas infrastructure for possible future use?

A: Gas infrastructure lasts about 50-60 years. Regarding installing the infrastructure for possible future use, there is significant value for the community in using gas infrastructure as efficiently as possible. Gas distributors move more energy than electricity distributors at a much lower cost. Gas networks are a highly efficient way to move energy and AusNet believes it is absolutely to the benefit of Victorians that all options for decarbonisation are kept open.

Q: Hydrogen is a very dangerous gas to handle and use – is our bottled gas industry ready?

A: The gas industry are experts at moving flammable gases and have been doing extensive research as part of the Future Fuels Cooperative Research Centre.

Research and reports on safety expectations and new technical standards are available via the FFCRC website at <https://www.futurefuelscrc.com/research/social-acceptance-public-safety-security-of-supply/>

Q: Has the electricity network's capacity for taking on gas load accounted for rising demand for EVs happening in parallel?

A: No, it does not include EV load. As outlined on slide 25 of the pack, we have calculated the additional investment needed in the electricity network to handle 50% household gas use by 2030, as per the Victorian Gas Substitution Roadmap. This modelling deliberately does not include other factors, such as EVs, as it seeks to illustrate the impact of 50% of gas load being electrified.

There is much work being done to forecast EV uptake and its impact on networks. Independent research (by the CSIRO to support AEMO's planning) on projected EV uptake is available via the [AEMO website](#).

Q: Will the changes in the Victorian Gas Substitution Roadmap also affect non-residential construction/developments?

A: The focus of the Roadmap is currently on residential customers. However, it flags that the Victorian Government will work on incentives and programs for commercial customers to aid efficiency and electrification.

Q: Could we assume additional kiosk substations will be needed to compensate for the removal of gas, but this infrastructure is only needed until domestic batteries become domestically viable? Does this mean the additional assets we install now may become 'stranded'? If so, will this impact contributions collected for these additional assets?

A: Additional kiosk substations will be required for all-electric estates. Widespread domestic batteries can reduce the network capacity required for new estates though we do not expect this to happen quickly. In parallel, we do not expect significant numbers of customers to disconnect from the grid and we expect household electricity consumption to continue increasing, particularly if gas and transport loads are electrified, so we do not foresee significant risk of electricity assets becoming stranded. Capital contributions are re-calculated periodically based on forecast uptake and consumption within the estate, but we do not expect household batteries to significantly impact capital contributions models in the short- to medium-term and perhaps not long-term.

Domestic batteries are undoubtedly part of the future energy mix though the role they will play is still uncertain. Neighbourhood batteries are another channel for optimising electricity supply costs for all-electric estates and some developers are starting to look at these technologies.

Q: At what point in time do domestic batteries need to be factored into the energy delivery model? Will there be ground type batteries that will be charged during off-peak periods and used during peak time, instead of kiosk substations? If so, will land still be required?

A: Batteries are potentially a network option to assist with managing peak loads. They will not replace kiosk substations but may help to reduce the number needed or the need to build new kiosks in existing built-up areas when demand increases. The concept of network-operated batteries is very new and many technical issues, including battery life, would need to be considered. It is expected that there would be a land requirement to host batteries. That said, we know some developers are starting to look at these solutions.

Q: What changes to consumer appliances are likely to be needed to use blended gases?

A (from AGIG): We believe current appliances can take blends of up to 20% hydrogen. Existing gas appliances will continue to work safely and reliably on blended renewable gas. The characteristics of the blended renewable gas supplied as part of the AGN's projects are consistent with those set out for natural gas within the Australian Standard.

Any appliances sold in Australia are subject to testing to ensure they work safely and reliably with natural gas. They are tested with varying gas compositions to account for the varying sources of natural gas supplied around Australia. One of these "limit" gas compositions already contains 13% hydrogen, and therefore all certified household gas appliances sold in Australia have undergone a range of safety tests with this level of hydrogen.

We are also undertaking our own appliance testing program, in which an Australian certified laboratory tested Australian appliances with various percentages of hydrogen. Initial test results indicate that appliances will work safely and reliably with a 5% hydrogen blend. This is consistent with literature and international projects which are supplying up to 20% hydrogen blends.

From the testing and analysis done to date, Gas Appliance Manufacturers Association of Australia (GAMAA) regard it as highly unlikely that there will be any problems with existing natural gas appliances during a progressive introduction of hydrogen at a concentration of up to 20% in the gas supply. For hydrogen concentrations beyond 20% in many cases it will be necessary to modify existing appliances or replace them, this will depend on the appliance type and manufacturer.

Q: What kind of additional pressures would an increase in water consumption of 2-3% of total water use have on the overall water security? Are there plans to offset this increase or work with desalination systems? If these are rolled out as decentralised systems in new estates or regions, will we need to consider additional pressures in the water network designs?

A (from AGIG): Water is a precious resource, and we are conscious to use it respectfully. Producing 1kg of hydrogen through electrolysis requires 9-to-15L of water.

Recent Australian Renewable Energy Agency (ARENA) funded studies into the feasibility of hydrogen in the gas distribution networks in Victoria by the Australian Hydrogen Centre found about 28,400ML of water will be required each year to produce sufficient hydrogen for 100% conversion of Victoria's distribution networks, which equates to 0.25% of the annual physical water use in Victoria in 2019-20.

The hydrogen industry should ensure that all water for hydrogen production is sustainably sourced, even though it would require low volumes. The industry is always looking for ways to make water consumption more sustainable,

for example we are targeting increased efficiency and considering ways to use desalinated water and wastewater.

Q: Is there increased risk of explosion if gas mains are breached by a civil contractor in a blended system? Is that the same with an unidentified gas leak where there is a steady stream of hydrogen that might meet an ignition source?

A (from AGIG): Our commitment to safety underpins everything we do, and we must be satisfied that our renewable gas projects are safe before first production.

Hydrogen, like other fuels, is flammable and this is a key reason it can provide us with energy. It also means we need to treat hydrogen and renewable blended gas with respect, as we do natural gas, electricity, petrol and other energy carriers.

The properties of hydrogen are well known and there is a significant body of evidence on its safe handling, including from industries that have produced, transported and used hydrogen for more than 100 years.

As long-term owners of the gas networks, we are satisfied that we can adapt to the safety requirements for managing renewable gases. We are further subject to regulation by government bodies, which are designed to ensure our commitment to safety, reliability and service continue.

The Future Fuels Cooperative Research Centre has conducted extensive research safety expectations and new technical standards. These are available via the FFCRC website at

<https://www.futurefuelscrc.com/research/social-acceptance-public-safety-security-of-supply/>

Q: I see a risk with only having one source of energy supply to a home. Is there some way of bringing forward renewable gas?

A: This is an important topic, and we expect a lot more discussion on this. Please refer to the response below about how quickly gas services can be converted to hydrogen.

Q. How will AusNet address the electrical infrastructure reinforcement for existing gas customers in major North-East Victorian towns (e.g., Kilmore, Broadford, Seymour, Euroa, Benalla, Wangaratta, Wodonga) and others supplied from the natural gas corridor?

A: Multiple factors will impact the demand associated with electrification of natural gas networks and the electrical reinforcements required. AusNet will continue to regularly revise demand forecasts to identify constraints, augment our network in a timely manner and continue to maintain supply to communities. Studies suggest the following augmentation in the North-East region may be required:

Zone Substation	Key Towns	Zone Substation Augmentation	HV Distribution Feeder Augmentation	LV Augmentation
Kilmore South	Kilmore, Broadford	Yes	-	23
Seymour	Seymour, Broadford	Yes	1	82
Benalla	Benalla, Euroa	Yes	1	113
Wangaratta	Wangaratta, Rutherglen	Yes	4	116
Barnawartha	Chiltern, Rutherglen, Wodonga	No	-	24
Wodonga	Wodonga	No	-	12
Wodonga TS 22kV	Wodonga	No	2	88

The following sub-transmission augmentation may also be required:

- augmentation works at 2 terminal stations
- augmentation works on 2 sub-transmission lines.

Q. How quickly can the gas services be converted to Hydrogen? This seems to be the key issue.

A (from AGIG): Renewable gas is now here. Hydrogen Park South Australia commenced in May 2021 and is delivering volumes of up to 5% renewable hydrogen to more than 700 homes in the suburb of Mitchell Park.

The proposed Hydrogen Park Murray Valley facility is planned to deliver an up to 10% renewable hydrogen blend to homes, businesses and industry in Albury Wodonga in early 2024.

This is just the start. On our distribution networks, we are targeting 10% renewable gas by volume by 2030. Our aim is to fully decarbonise our distribution networks by 2040 as a stretch target and by no later than 2050.

This is consistent with Australian state and territory ambitions which collectively target being net zero carbon by 2050, and with the ambitions of several states who are explicitly targeting 10% renewable gas in networks by 2030.

Interestingly, there is precedent for Victoria's gas networks transporting high volumes of hydrogen. In the 1960s and 1970s, Victoria moved to natural gas from 'town gas', which was a gas blend comprising up to 60% hydrogen.

Research by the Australian Hydrogen Centre has further found that with minor work on capacity, pipe, and component compatibility, Victoria's existing natural gas distribution networks can be utilised to transport 100% hydrogen.

Q. This process has introduced a carbon tax and the electrical network has seen additional loading due to underestimating the electrical loading of gas hot water/heat pump systems. Can we discuss this?

A: It is correct that there are capacity challenges on certain parts of the network, and forecasting demand is always an estimate. The capacity of our electricity networks is being expanded to support increased load, though this will take time. We strongly encourage all developers to work closely with builders to understand the likely electricity demands of homes in new estates. This will help ensure we have the right capacity in the right locations to keep network augmentation costs efficient and minimise disruption for customers.

Q. What would be the cost of renewable hydrogen to customers, compared to the current cost of natural gas? Do you have any forecasts in relation to how this cost may come down in the future as the scale of facilities increases?

A: We understand that price is very important to our customers. At the moment, producing renewable gas is a new industry in Australia and is more expensive than natural gas.

Research indicates that net zero emissions from gas networks can be reached with renewable hydrogen at half the cost of electrification. This is supported by a series of reviews, studies, research and analysis to inform Australia's National Hydrogen Strategy that further indicates replacing natural gas with renewable hydrogen is cheaper than replacing it with renewable electricity.

Just like solar, wind and battery power, we need to develop projects and increase scale in order to drive down costs. We are doing this with the support of Government funds such as ARENA, who have committed project funding in order to minimise the cost impact on customers of receiving renewable gas.

Our modelling indicates that renewable hydrogen and biomethane can be produced at prices equivalent to natural gas by 2030, if not before. This is consistent with the Federal Government targets of "H2 under \$2 per kg". At this time we will look to increase our blending activity to 100% renewable gas.

Q. Can you provide us with an update on the Hume hydrogen highway?

A: Information about the Hume Hydrogen Highway project and its progress are available via:

- <https://www.energy.vic.gov.au/grants/hume-hydrogen-highway>
- https://www.energy.vic.gov.au/grants/hume-hydrogen-highway#toc_id_5_industry

Applications for funding to support the design and development of the renewable hydrogen refuelling network along the Hume Highway between Melbourne and Sydney are open now. Applications must be received before 28 October 2022.

Q. Following this forum, could you include links to 'independent' studies/reports on the renewable gas? i.e. not commissioned by an interested party

A: The following studies and reports are government led:

- [CSIRO - National Hydrogen Roadmap](#)
- [COAG Energy Council – Australia's National Hydrogen Strategy](#)

The below are industry-based studies and reports that might be of interest:

- Deloitte assisted with [Energy Networks Australia Gas Vision 2050](#)
- [Research by GPA for APGA](#) on the cost of moving renewables via pipelines vs. powerlines
- [Modelling from the University of Melbourne and the Future Fuels CRC](#) on the electrification of heating to understand the costs associated with switching from gas to electric appliances in the home
- [Frontier Economics](#) on the benefits of gas infrastructure to decarbonise Australia
- [Clean Energy Finance Corporation's Australian hydrogen market study](#)
- [Australian Energy Transitions Initiative Phase 1 highlights report.](#)

Action items			
Action	Assigned to	Status	Due date
Nil	-	-	-