20 April 2023

APGA Submission: Regulating for the prevention of new fossil fuel gas network connections

The Australian Pipelines and Gas Association (APGA) represents the owners, operators, designers, constructors, and service providers of Australia's pipeline infrastructure, connecting natural and renewable gas production to demand centres in cities and other locations across Australia. Offering a wide range of services to gas users, retailers and producers, APGA members ensure the safe and reliable delivery of 28 per cent of the end-use energy consumed in Australia and are at the forefront of Australia's renewable gas industry, helping achieve net-zero as quickly and affordably as possible.

APGA welcomes the opportunity to help inform the ACT Government's proposed regulation to prevent new gas connections. As a vocal supporter of a rapid transition toward net zero[1], APGA shares the Government's ambition to decarbonise the ACT by 2045, but differ from the views of the ACT Government around the role of renewable gases as a cost competitive gas use decarbonisation alternative for the ACTs residential gas consumers.

APGA also appreciates the engagement we have had with representatives of the ACT Government to date on this consultation. We understand the ACT Integrated Energy Plan, due to be released for community consultation later in 2023, will provide more detail on the ACT Government's plans for renewable gas, and we look forward to contributing.

APGA is at the forefront of the domestic renewable gas industry with the most recent Gas Vision 2050[2] report illustrating the industry's commitment to deliver the lowest-cost pathway for households and businesses to reach net zero by 2050.

Renewable gases represent a real, technically viable approach to lowest-cost energy decarbonisation in Australia. As set out in Gas Vision 2050, APGA sees renewable gases such as hydrogen and biomethane playing a critical role in decarbonising gas use for retail and wholesale customers. APGA is the largest industry contributor to the Future Fuels CRC[3], which has over 80 research projects dedicated to leveraging the value of Australia's gas infrastructure to deliver decarbonised energy to homes, businesses, and industry.

While we broadly support the ACT Governments aim to be forward-looking regarding its decarbonisation goals, the demonisation of gaseous energy ignores the cost-effective contribution that renewable gases can play as part of the transition to net zero.

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[1] APGA, *Climate Statement*, available at: https://www.apga.org.au/apga-climate-statement
[2] APGA, 2020, *Gas Vision 2050*, https://www.apga.org.au/sites/default/files/uploaded-content/website-content/gasinnovation_04.pdf
[3] Future Fuels CRC: https://www.futurefuelscrc.com/

The Consultation demonstrates it is the intention of the ACT Government to oppose residents' ability to choose to decarbonise via cost competitive renewable gas alternatives. In the hope that the ACT Government will abandon its plan to act in opposition of the interests of its residents, APGA raises the following topics:

- Understanding cost competitive gas use decarbonisation alternatives through the lens of Total Customer Cost, including an understanding of assumptions;
- Case Study: ACT Suburb Zero household decarbonisation cost comparison;
- Understanding ACT resident interest in renewable gas use in the home;
- Facts about gas appliance safety; and
- The missed opportunity of renewable gas.

On these bases, APGA strongly recommends that the ACT Government pause its action against gas connections in order to consider the full potential of renewable gas uptake for gas use decarbonisation in the home through its proposed Integrated Energy Plan.

To discuss any of the above feedback further, please contact me on +61 422 057 856 or jmccollum@apga.org.au.

Yours Sincerely,

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Understanding cost competitive gas use decarbonisation alternatives

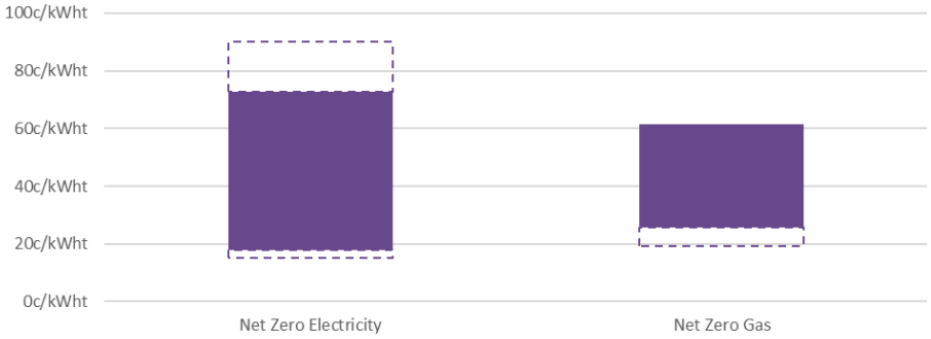
It is regularly asserted that for households and some commercial users, renewable energy is 'cheaper' than reliance on fossil fuel energy, especially in terms of heating systems. Generally this relies on the cost effectiveness or efficiency of individual components of energy supply chains, and fails to take into account the total cost of those supply chains to the customer.

In 2022, APGA undertook a study[4] to examine the costs of the energy supply chains which provide heat to household consumers. This study considered all aspects upstream of the purpose for which a customer is using energy – including the cost of the appliance, the cost of the energy used, and the efficiency of the appliance using this energy.

While this study currently only considers data for freestanding homes which use gas today in Victoria, there are applicable lessons across other sectors, including commercial and high-density residential. This analysis is not directly related to housing in the ACT but there are considerable similarities in housing stock and climatic conditions between the ACT and Victoria.

Despite electric heat pump appliances having vastly greater energy efficiency within this example, the renewable gas pathway displayed comparable economic efficiency to the renewable electricity pathway for gas use decarbonisation in the home. This means that gas use decarbonisation for these customers is cost competitive whether achieved via renewable gas or renewable electricity uptake. We would like to see this analysis undertaken for residential energy customers in the ACT.

Figure 1: Customer cost of heat in the home, FY2020-21, for a freestanding house in Victoria.



Source: APGA, 2022, Supply chain analysis methodology for total customer cost

Figure 1 displays study results for customer cost of zero emission heat in the home for freestanding homes in Victoria which currently using gas for heat, founded upon 2020-21 financial year price data. The solid bars display the ranges of total customer cost of heat,

[4] APGA, 2022, *Supply chain analysis methodology for total customer cost*, https://www.apga.org.au/sites/default/files/uploaded-content/website-content/supply_chain_analysis_methodology_for_total_customer_cost_-_final.pdf
Study summary:
https://www.apga.org.au/sites/default/files/uploaded-content/website-content/supplychainv5.pdf

including retail energy and appliance costs in a net zero energy future, and include sensitivities (dotted bars).

As demonstrated in Figure 1, retail net zero gas is cost-competitive with (and can be cheaper than) retail net zero electricity for heating free standing homes in Victoria which use gas appliances today. This makes renewable gases a viable, cost-efficient option for gas use decarbonisation, even where it may not be the most energy efficient option.

Differences in assumptions between APGA and the ACT Government

In our conversations with ACT Government representatives, we have identified several areas where assumptions differ. These differences in assumptions necessarily create differences in results and conclusions.

Production costs of hydrogen and biomethane

In our research, APGA assumptions on production costs for hydrogen are derived from CSIRO[5] and supported by research by the ANU.[6] CSIRO aligns with international predictions of hydrogen approaching $4 per kilogram ($27.97 per GJ) in coming years and $2 per kilogram ($13.99 per GJ) by 2030. Renewable hydrogen production costs globally are expected to fall below USD $2/kg after 2030 assuming electrolyser and renewable energy costs reduce as is expected.

APGA is unsure of the source of or the quantum the ACT Government's assumptions of the cost of hydrogen production.

APGA also suggests that the ACT Government consider in detail the 2023 *State of Hydrogen 2022* report,[7] which outlines in considerable detail where Australia is working towards addressing the limiting factors towards hydrogen production costs: namely the cost of renewable electricity, and the capital costs of electrolysers.

Our assumptions of costs of biomethane are derived from research from the Future Fuels CRC, which are available on request from the CRC. The CRC has priced biomethane in a range of Australian-centric scenarios, deriving a wholesale cost range of $14.70-29.40 per gigajoule today, with estimated future costs considerably lower and equivalent to predicted hydrogen costs. The APGA study uses a conservative range of costs for biomethane, which are higher than the $12.20 per GJ cost assumed in the *Australian Bioenergy Roadmap*.[8]

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[5] CSIRO, 2018, *National Hydrogen Roadmap,* https://www.csiro.au/en/research/environmental-impacts/fuels/hydrogen/hydrogen-roadmap

[6] Longden T, Jotzo F, Prasad M, Andrews R, 2020, *Green hydrogen production costs in Australia: implications of renewable energy and electrolyser costs*, Centre for Climate Change and Policy Working Paper 20-07, https://ccep.crawford.anu.edu.au/sites/default/files/publication/ccep_crawford_anu_edu_au/2020-09/ccep20-07_longden-jotzo-prasad-andrews_h2_costs.pdf

[7] DCCEEW, 2023, *State of Hydrogen 2022*, https://www.dcceew.gov.au/sites/default/files/documents/state-of-hydrogen-2022.pdf

[8] ARENA, 2021, *Australia's Bioenergy Roadmap*, https://arena.gov.au/assets/2021/11/australia-bioenergy-roadmap-report.pdf

Appliance replacement costs and payback period

APGA's assumptions on appliance costs are based on work by Frontier Economics on behalf of the Gas Appliance Manufacturer's Association on the switching from gas to electric appliances in the home.[9] Like APGA's study, this is based on the Victorian market, and there are likely some subtle differences between Victoria and the ACT with respect to appliance and installer availability and cost that would make it relevant for the ACT Government to consider its own study. Nevertheless, the costings within the Parliamentary Budget Office's "Suburb Zero Pilot" in the ACT[10] lay within the appliance cost estimate range produced by the Frontier Economics report referenced by APGA's analysis.

Also note that the Frontier Economics study uses a 10-year payback period for appliances, where some authorities consider a 15-year payback period to also be appropriate.

Renewable gas availability through pipelines

It is apparent that the ACT Government assumes future renewable gas use in the ACT must only come from local production, either directly within the Territory or immediately adjacent to it. While the ACT Government has not disclosed its modelling, APGA is concerned that these constraints artificially and substantially increase cost and reduce accessibility of renewable gases in the ACT.

The ACT is currently supplied natural gas via gas pipeline from South Australia, Victoria and Queensland. Renewable gas is also able to be supplied to the ACT in this manner. Biomethane could be readily sourced from these same states and supplied through the two existing transmission pipelines that provide natural gas today. Similarly, transporting renewable hydrogen from interstate via pipeline would be cheaper than transporting renewable electricity via powerlines[11].

These pipelines could deliver contracted biomethane or hydrogen to the ACT to rapidly and affordably decarbonise gas use, with the total biomethane potential in states connected to the ACT by pipeline totalling 55 times that of total gas demand.[12]

The ACT declares that it uses 100 per cent renewable electricity. Realistically this is achieved through contracts it has secured with interstate renewable electricity producers, and which also smooths electricity supply when the ACT's renewable electricity generation

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[9] Frontier Economics, 2022, Cost of switching from gas to electric appliances in the home, https://gamaa.asn.au/wp-content/uploads/2022/07/Frontier-Economics-Report-GAMAA.pdf

[10] Parliamentary Budget Office, 2022, *Policy costing: Suburb Zero pilot in the ACT*, https://www.aph.gov.au/-/media/05_About_Parliament/54_Parliamentary_Depts/548_Parliamentary_Budget_Office/Costings/Publicly_released_costings/2023/Suburb_Zero_pilot_in_the_ACT_PDF.pdf

[11] GPA Engineering, 2022, *Pipelines vs Powerlines: A Technoeconomic Analysis in the Australian Context* available at https://www.apga.org.au/sites/default/files/uploaded-content/field_f_content_file/pipelines_vs_powerlines_-_a_technoeconomic_analysis_in_the_australian_context.pdf

[12] Deloitte Access Economics, 2017, *Decarbonising Australia's gas distribution networks*, available at https://www.energynetworks.com.au/resources/reports/decarbonising-australias-gas-distribution-networks-deloitte/

capacity does not meet demand. The same principle can also apply for zero emission biomethane, and eventually hydrogen supply.

There is no suggestion that the ACT would need to develop its own local hydrogen or biomethane production capacity, although the opportunity for some production certainly exists given the Territory's existing waste feedstock, penetration of renewable energy generation, and sizable existing gas customer base.

Case Study: ACT Suburb Zero pilot household decarbonisation cost comparison

Whether decarbonising through electrification or renewable gas, it is important to note ACT consumers will experience higher costs than continuing to use natural gas. However, sufficient data is available to undertake direct cost comparison of gas use decarbonisation through renewable electricity and renewable gas alternatives as seen in Table 1.

Table 1: Basis of cost of household decarbonisation

Via Biomethane	Via Electrification
ACT gas customers are supplied gas originally sourced in Victoria, South Australia, or Queensland via two gas transmission pipeline connections[13]. Biomethane, which can be produced for between $15 and $30 per gigajoule, could be produced along these routes and imported for $1 to $2 per gigajoule[14,15,16]. This puts conversion to biomethane at a premium of $5 to $15 per gigajoule above the cost of natural gas. Customers would not need to spend additional capital on appliances, and gas infrastructure would not require modification.	The Suburb Zero pilot program provides 50% funding for full gas use electrification in up to 1000 ACT households. This includes electrification of space heating, hot water, stoves, the installation of solar PV, and for a small proportion of households, electric vehicles (but not batteries). The ACT Parliamentary Budget Office provided costing of gas use decarbonisation through electrification in its costing analysis of the Suburb Zero pilot in the ACT. The PBO report estimates the cost of electrifying household gas use at around $24,700 per household. Households outside of this scheme would need to purchase appliances at this average of $24,700 per household, plus the purchase of electricity during peak demand periods.[17]

Comparing the possible biomethane premium range with the possible appliance cost range derives the following costs for gas use decarbonisation across a 15-year period in nominal

[13] AEMC, 2023, *Gas pipeline register,* available at https://www.aemc.gov.au/energy-system/gas/gas-pipeline-register
[14] Future Fuels CRC research; available on request.
[15] Australian Competition and Consumer Commission, 2023, *Gas inquiry 2017-30 Reports*, available at https://www.accc.gov.au/about-us/publications/serial-publications/gas-inquiry-2017-30-reports
[16] Doing so would replicate the approach the ACT takes to declare that its electricity customers use 100% renewable electricity, which is sourced from interstate via the NEM alongside other carbon intensive electricity.
[17] Australian Parliamentary Budget Office, 2023, *Policy Costing Suburb Zero pilot in the ACT*, https://www.aph.gov.au/-/media/05_About_Parliament/54_Parliamentary_Depts/548_Parliamentary_Budget_Office/Costings/Publicly_released_costings/2023/Suburb_Zero_pilot_in_the_ACT_PDF.pdf?la=en&hash=77EAC46E8D180A3B5DDE52BDF34C700CABB33AD7

dollars (Table 2). Even applying the highest biomethane premium, gas use decarbonisation in the ACT will cost energy consumers less than the PBO cost estimate for electrification.

By banning gas connections, the ACT Government will prevent its citizens from accessing lower cost renewable energy in the form of biomethane.

Table 2: Cost of 100% gas use decarbonisation based on biomethane premium

Decarbonisation Pathway	Annual cost for average ACT household[18]	15yr cost for average ACT household[19]	Cost of abatement per tCO2e[20]
Transition to biomethane (+$5 per GJ)	$175	$2,620	$97 per tCO2e
Transition to biomethane (+$10 per GJ)	$349	$5,239	$194 per tCO2e
Transition to biomethane (+$15 per GJ)	$524	$7,859	$291 per tCO2e
Electrification of gas demand (PBO Costing)	$1,647	$24,700	$915 per tCO2e

The costs of decommissioning gas networks in the ACT are not well considered in the Issues Paper. Critically, nor are the costs of augmenting existing electricity transmission and distribution networks, both to replace demand currently met by gas as well as ensure resilience to the nature of variable renewable energy generation. The cost of new transmission and distribution infrastructure will result in increases in network charges for all customers across the National Electricity Market.

Data from APA Group for the ACT has found the current average cost to deliver energy through the electricity distribution network is substantially higher than the gas distribution network (Table 3). It is likely to become significantly more expensive in the future with full electrification, which also doesn't take into account other factors including the impending replacement of street-level wiring in the ACT, which are nearing the end of their service life.

Table 3: Relative cost of energy delivery for gas distribution and electricity distribution in the ACT.

ACT distribution network	Regulated asset base ($m)	Actual annual revenues ($m)	Actual energy delivered (GWh)*	Average cost to deliver a GWh ($)
Electricity	981	140	2,851	49,106
Gas	377	67	2,201	30,436

*Source: APA Group. * 1TJ = 0.277 GWh*

[18] Australian Energy Regulator, 2020, *Residential energy consumption benchmarks,* available at: https://www.aer.gov.au/system/files/Residential%20energy%20consumption%20benchmarks%20-%209%20December%202020_0.pdf

[19] A 15 year period is used to account for the 10 to 15 year design life of most heating appliances.

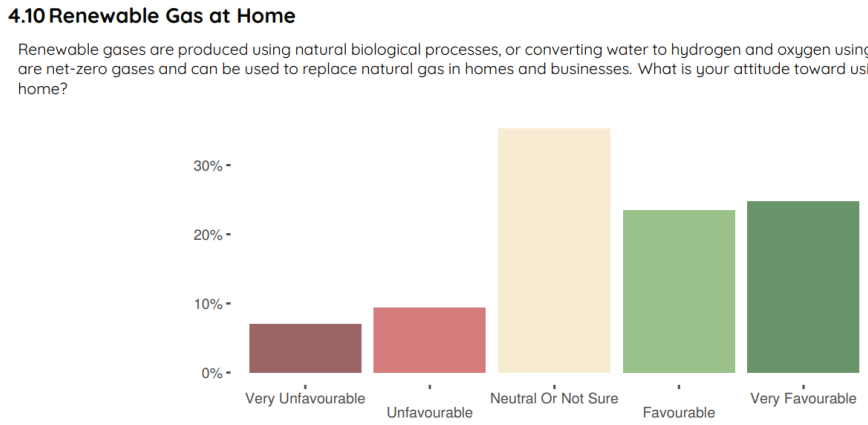
[20] *National Greenhouse and Energy Reporting (Measurement) Determination 2008,* available at https://www.legislation.gov.au/Details/F2022C00737/Download

ACT residents are interested in renewable gas use in the home

Through our ongoing consultation with the community, we recognise there is enthusiasm for the energy transition and for the use of renewable gases in the home. Fewer than 17 per cent of residents in the ACT hold an unfavourable view of renewable gas in the home, as compared with 48 per cent who consider it favourable or very favourable (Figure 2).

We urge the ACT Government to be mindful of community's views when it comes to renewable gas.

Figure 2: Survey of ACT residents on renewable gases in the home (March 18-25, n=1101)



	Very Unfavourable	Unfavourable	Neutral Or Not Sure	Favourable	Very Favourable
All Respondents	**7.0%**	**9.4%**	**35.4%**	**23.5%**	**24.8%**
Age					
18 - 24	5%	19%	35%	16%	24%
25 - 34	8%	10%	34%	26%	23%
35 - 49	7%	8%	36%	23%	26%
Gender					
Female	4%	8%	41%	26%	21%
Male	9%	8%	27%	25%	32%

Source: Polling undertaken by RedBridge on behalf of APGA.

Facts about gas appliance safety

APGA has prioritised the safe and reliable delivery of gaseous energy for more than 55 years, with numerous public campaigns focussed on promoting positive health and safety outcomes, including our ongoing support for the Before You Dig initiative.

Contrary to assertions in the Issues Paper, it has been determined through 2023 independent academic analysis the type of appliance (gas or electric) used to cook food indoors is not a significant determinant of residential indoor air quality. While CO and NOx emissions and post-combustion formation of NO_2 are unique to gas ranges due to the combustion of natural gas, their concentrations in residential indoor air do not pose a health risk above that of cooking food in and of itself.[21]

[21] Tormey et al, 2023, *The Effects of Cooking on Residential Indoor Air Quality: A Critical Review of the Literature with an Emphasis on the Use of Natural Gas Appliances* available at https://www.calrest.org/sites/main/files/file-attachments/analysis_effects_of_cooking_on_indoor_air_quality_3.2.2023.pdf

The Gruenwald study incorrectly concludes 13 per cents of childhood asthma cases can be linked to indoor use of gas stoves and been shown to be misleading. Independent review of the data reveals there is not a statistically significant relationship between NO_2 and asthma.

Further, Gruenwald's data indicates any adverse health effects may be due to the foods being cooked (or other confounding factors) rather than the specific fuel used. The report finds **no distinguishing factor** of gas cooking appliances, relative to electric cooking appliances, for which an association with childhood asthma has been suggested. Rather, particulates from the actual cooking process are of concern and can be addressed though adequate ventilation.

It is important that in considering the health consequences of technologies that data be considered correctly and in the appropriate context. Continued exhortations of inaccurate health conclusions are disingenuous and misleading, leading a significant mismatch between public rhetoric and reality when it comes to the safety of gas cooktops.

The missed opportunity of renewable gas

The Issues Paper states the outcome of this consultation is not intended to and will not prevent the ACT from using renewable forms of gas in the future, and connections to a 100 per cent renewable gas network are excluded from this ban. The Issues Paper also states, referring to hydrogen but also applicable to biomethane, that "the ACT Government does not currently view green gas as a viable widescale option to support the Territory's emissions reduction targets". This ignores the significant opportunities for renewable gases to contribute to the ACT's decarbonisation targets.

ACT Government consultation on gas use decarbonisation to date demonstrates little appetite for investment or regulation to enabling renewable gases. The potential of this form of renewable energy appears to be misunderstood, especially in relation to support for blends of natural and renewable gases. This is despite the ACT electricity grid (and electricity grids globally) supporting the blending of renewable and fossil electricity in the build up to achieving 100 per cent renewable electricity.

The only new gas connections not proposed to be banned are connections to 100 per cent renewable gas networks. This demonstrates endorsement for the genuine zero carbon credentials of renewable gases, addressing any concern of 'greenwashing'. Given that gas blending is in some respects a necessary first step to move to 100 per cent renewable gas networks, a lack of support for blending of renewable gases acts as an intentional impediment to renewable energy uptake.

APGA is concerned that the ACT Government is writing off the possibility of renewable gases to assist the ACT's decarbonisation journey without a full understanding of the potential effects of this decision. Decarbonising gas use through renewable gases is a cost-competitive option, and it should not be removed as an option for current and future gas customers in the ACT.