Submission to the Australian Energy Market Commission's

Review into extending the regulatory frameworks to hydrogen and renewable gases

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Dr Jim Crosthwaite, PhD, M.Comm., B.Ag.Eco.

In this submission, I draw on

- My two other submissions related to Regulatory Review (the Official's Paper, AEMO)
- My submission to the Australian Energy Regulator on APA's 2023-27 Access Arrangement.[1]

URLs were checked just prior to submission.

Preamble

The Energy Ministers have not prescribed definitions for gas blends or an approach to reform in their Terms of Reference for the AEMC Directed Review.[2]

AEMC thus has a choice about definitions and about the pathway to reform of the national gas regulatory framework to allow hydrogen and renewable gases. AEMC has chosen vague definitions and a pathway of wholesale reform, while rejecting case by case approvals for injection of hydrogen and gas blends into the pipeline network.

There are strong economic arguments for a different approach.

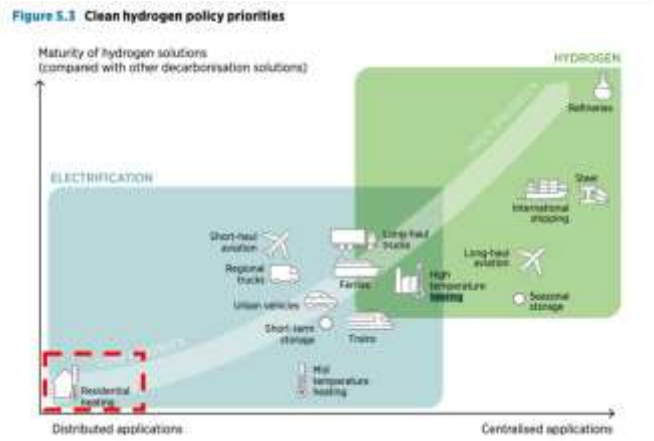
In Summary

1. Development of a hydrogen industry is important, but not via blends in the gas network
2. Definitions of gases should specify production method and emissions
3. Priority for the national gas regulatory framework should be emission reduction and decommissioning the gas network
4. Wholesale gas regulatory reform now is a mistake. The approach should be case-by-case approval so the focus is on emission reduction and avoiding lock-in to fossil fuels
5. Authorities should be focused on planned reduction in gas supply, not its growth - and not leaving low-income people behind and stuck with high gas bills
6. Authorities should not create a regulatory framework that facilitates unnecessary investment in the gas supply network, with the cost foist on energy users

Hydrogen Futures

Australia, and each state, needs to build an hydrogen industry, but not on the shifting sands of supplying energy to households when rapid transition to complete electrification has begun. Building scale in green hydrogen production should be focused directly on the uses where hydrogen has strong advantages, such as long-distance transport and industries requiring high heat.

It is hard to see how a hydrogen industry can be competitive and cost effective if it is based on supplying gas services to



[1] https://www.aer.gov.au/networks-pipelines/determinatio
access-arrangement-2023%E2%80%9327/proposal#step-79
[2] https://www.aemc.gov.au/market-reviews-advice/review-gases

households. Public policy makers should find more direct means to foster this infant industry than by allowing injections of hydrogen of unspecified provenance into the gas pipelines.

Supplying hydrogen to households should have very low priority, as identified in this figure from IRENA.[3]

Gas definitions and consumer choice

The proposed reforms will obscure information about the production method and emissions content of the gas blends. The proposed reforms require consumers to be told 'when' they now have a new gas blend, but not 'what' it is! A growing majority of consumers want transparency to inform their choices. They want clean and affordable energy, not 'dirty' hydrogen.

I wish to make the following points about consumer interests:

1. The creation of new services and commodities relating to hydrogen, biogas and other natural gas equivalents should not be an end-goal in and of itself but should be based on maximising consumer choice and creating efficient least-cost supply options.
2. Long-term consumer interest requires transparency that should be directly addressed in identifying, classifying and defining in-scope gases and blends. Giving choice to consumers about the services and commodities that they buy enables them to maximise their utility.
3. Consumer choice requires that gases and blends should be identified by the carbon intensity of a) their production method and b) their carbon emissions when burnt. Consumers are increasingly judging products and services by their environmental impact.
4. Transparent information ***over time*** is critical, especially as the reforms are intended to widen the scope of services and commodities available to consumers. Knowing the constituent gases in new services that are offered is fundamental to consumer choice
5. Recent cross-country research by Deloitte highlights the high level of consumer expectation about the climate impacts of products and services on offer.[4] The World Economic Forum includes a guide on its website for consumers to take informed action via purchasing decisions.[5] These are just two examples to highlight how transparent information about climate impacts increasingly underpins utility maximisation by consumers.
6. The AEMC has been vigorously working to increase consumer choice in retail electricity markets.[6] Choice should be pursued across all energy markets, including gas.
7. Transparency about the composition of gas blends is also necessary to allow the building of data sets that will help develop public policy, especially for emission reduction targets.

The Reform Pathway

AEMC should review its preferred pathway to reform of the gas regulatory framework.

Firstly, consultation about the National Regulatory Reform package has been inadequate:

1. As I understand it, very few organisations were given the opportunity for input when directions for the regulatory framework were being set. The Public Interest Advocacy Centre was invited to make a submission to the 2021 draft of the Official's Paper, but they represent organisations in only one state. It appears that other important groups were left out, or if invited, they did not have resources to make a submission.

[3] IRENA (2022), *Geopolitics of the Energy Transformation: The Hydrogen Factor*, International Renewable Energy Agency. Available at https://www.irena.org/publications/2022/Jan/Geopolitics-of-the-Energy-Transformation-Hydrogen

[4] https://deloitte.wsj.com/articles/consumers-expect-brands-to-address-climate-change-01618945334

[5] https://www.weforum.org/agenda/2021/02/consumers-help-solve-climate-change/

[6] https://www.aemc.gov.au/energy-system/retail

2. Australian Conservation Foundation and Friends of the Earth appear to be the only environmental organisations that made submissions in 2019 on the Discussion Paper for the National Hydrogen Strategy. They are strongly supportive of hydrogen as an energy source, but their submissions advocated production of hydrogen only with renewable energy. Elsewhere, as a quick google search will show, both groups strongly oppose using hydrogen in our pipelines because it prolongs use of methane. They do not appear to have been invited to make early submissions on the draft Official's Paper or other parts of this National Gas Regulatory Reform.

Secondly, AEMC should adopt a case-by-case pathway compatible with rapid decarbonisation. The AEMC review is vague on how and when decarbonisation should occur. There is no sense of action to make this happen consistent with climate targets. Decarbonisation targets are not mentioned, although AEMC repeatedly refers to its plans as 'targeted, fit for purpose and proportionate' (this exact phrase is used six times, and there are many others like it).

Case by case approval is appropriate, rather than the proposed wholesale reform that in effect gives carte blanche to the gas industry. Wholesale reform is difficult to reconcile with decarbonisation objectives and with protecting the long-term interests of current and future consumers. It is clear that case by case decisions will not disadvantage the nascent hydrogen industry, and give the best opportunity for careful oversight.

Growth in gas use is no longer in the public interest, and is being actively addressed initiatives such as Victoria's Gas Substitution Roadmap. The difficulty in dealing with further expansion in the regulatory framework was pointed out in 2021 by the Australian Energy Regulator (AER). Now:

> "it appears difficult to reconcile the inherent tension between decarbonisation objectives and the NGO without explicit guidance in the NGL or NGR on how to address the conflict between the two." (*Regulating Gas Pipelines under Uncertainty* p.58).[7]

Thirdly, the climate impacts of hydrogen and methane blends need much more consideration. The imperative to cut emissions and address climate change is now driving decisions by investors and governments, though not necessarily decisions of fossil fuel companies. The fat-tail risks of failure to address these issues have been identified by eminent economists, and should be considered in infrastructure planning and regulatory processes.[8]

Realistically, 10% hydrogen (by volume) blended in pipelines means 90% methane for decades to come. The role of methane in global emissions is significant. In fact, methane traps heat in the atmosphere at staggering levels compared to CO_2, as shown in the following figure. Scientists are finding that, when leaks are accounted for, methane emissions are much higher than generally understood.[9]

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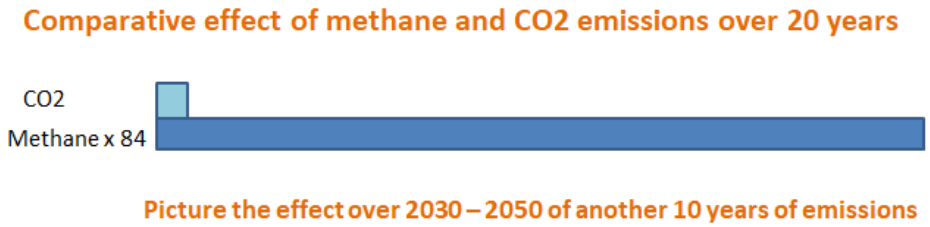
[7] https://www.aer.gov.au/networks-pipelines/performance-reporting/regulating-gas-pipelines-under-uncertainty-information-paper

[8] John Quiggin 2018 'The importance of 'extremely unlikely' events: tail risk and the costs of climate change' Australian Journal of Agricultural and Resource Economics 07 November 2017. https://onlinelibrary.wiley.com/doi/10.1111/1467-8489.12238

Weitzman ML. Fat-Tailed Uncertainty in the Economics of Catastrophic Climate Change. Review of Environmental Economics and Policy. 2011. 5(2) :275-292. https://scholar.harvard.edu/weitzman/publications/fat-tailed-uncertainty-economics-catastrophic-climate-change-0

[9] For leaks in Melbourne https://ui.adsabs.harvard.edu/abs/2020EGUGA..2212475K/abstract

For Australia, https://www.climatecollege.unimelb.edu.au/review-current-and-future-methane-emissions-australian-unconventional-oil-and-gas-production



Source: author, based on Myhre, G. et al., 2013 as cited in Carbon Brief 'Scientists concerned by 'record high' global methane emissions' *Carbon Brief* 14.7.2020.

Fourth, AEMC should account for cumulative growth in the infrastructure asset base. The move by transmission company APA and the gas distribution companies into blending hydrogen into the gas mix has the potential to involve very large capital costs, with little benefit, that will be borne by consumers for decades. As APA clearly states in documents for its 2023-27 Access Arrangement, only some of its pipe network could now carry hydrogen. $37.9 million is proposed to be spent by APA on investigations of pipeline suitability in the Victorian Transmission System.[10] An unknown sum will be needed to make them hydrogen-ready even at 10% volume. Note also that the energy density of methane is 3.2 times that of hydrogen.

Expenditure on producing hydrogen for the gas network and on making pipelines fit for hydrogen will not be isolated expenditures. The gas industry taken as a whole is proposing a whole range of capital expenditure. that directly relates to supplying households and businesses through existing pipelines. Capital expenditure now will require more replacement capital in the future – it is a compounding effect that energy authorities should address.

The more that the regulated asset base is allowed to grow – across the transmission and distribution networks - the more difficult it will be for government to deal with the eventual decommissioning of all or part of the gas networks. The more capex that is spent now, the more that will be needed in the future – just as replacement capital.

The dynamics of this cumulative growth are crystal clear from this remark by AER in its 2021 State of the Energy Market report:

> "Despite reduced investment since 2014–15, the total RAB for regulated gas pipelines continues to rise, reaching $12.1 billion in 2020 ($1.6 billion for transmission and $10.5 billion for distribution pipelines)" (p.23 Chapter 5).[11]

Fifth, investing in hydrogen in pipelines and other gas infrastructure will be very costly for consumers and governments. There are ***very large opportunity costs*** given that energy efficiency and electrification offer cheaper pathways to comfortable homes. Governments are working on policies to ease the upfront costs of electrification, and incentivise action by landlords. Energy efficiency has many unsung possibilities in the colder states. Victoria uses three times as much gas in winter, heating old leaky dwellings, as in summer. Alan Pears AM has written many articles on the potential and cost savings of energy efficiency.[12]

[10] APA 2021 'A look at plans for Victorian Transmission System. APA Victorian Transmission System 2023-2027 access arrangement proposal overview. December 1, 2021'. https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/apa-victorian-transmission-system-access-arrangement-2023%E2%80%9327

[11] https://www.aer.gov.au/publications/state-of-the-energy-market-reports/state-of-the-energy-market-2021

[12] See for example https://johnmenadue.com/energy-productivity-and-efficiency-improvement-australias-forgotten-fuels/

The momentum towards electrification is growing, and the costs are falling. Savings according to modelling commissioned by the Victorian Government for the Gas Substitution Roadmap are $840 per year in energy bills and $1,160 for homes with solar panels (see image). Tim Forcey argues that the Roadmap is like to see gas use fall by 50% within eight years.[13]

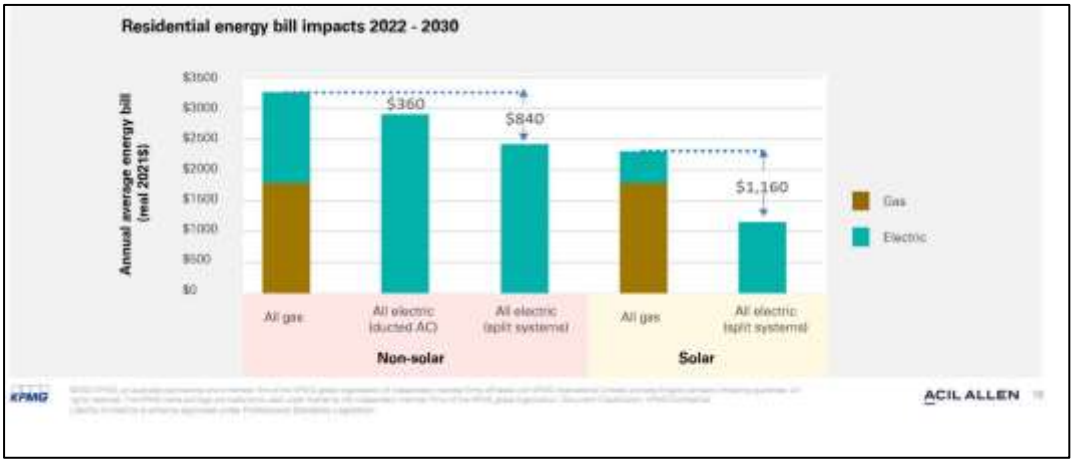


Image: Victorian Government Gas Substitution Roadmap stakeholder forum, February 2022.

Costs to consumers will rise in another way. While these companies are proposing to invest more to make the system hydrogen-compatible, they are asking regulators to reduce asset lives and allow depreciation over a shorter time. Consumers will pay if AEMC pursues wholesale reform of the regulatory framework. While final decisions on allowing gas blends may rest with state jurisdictions, opening up the regulatory framework will greatly increase the leverage of gas companies over both the states and the AER when it reviews proposed Access Arrangements.

Costs to consumers will skyrocket when the pipeline companies make investments that allow 100% hydrogen in the pipelines. This jump to 100% is recognised as the only real alternative, beyond 10%. This represents a whole new ball game involving massive costs, not only in making the pipelines ready but also in replacement of appliances and business equipment.

Later, Governments and consumers could face the cost of decommissioning gas pipeline infrastructure. Mechanisms need to be in place to ensure the investment proponents know in advance that they will bear the cost of further expansion of the infrastructure to accommodate hydrogen.

Sixth, wholesale reform will have unanticipated consequences. Extending the regime as proposed has potentially momentous implications that cannot be easily anticipated. The proposed changes open up the gas market to new products and to many suppliers using a range of production technologies.

Let us contrast the current and potential product offerings and their supply in order to understand the very different gas market that is likely to emerge.

- The current regulatory regime allows close oversight of a few large suppliers of ‘natural gas’ in a few large gas fields (leaving aside the question of market power)
- The new regime will be dealing with potentially many suppliers, and many injection points into the gas network. As Natural Gas Equivalents can be produced at small scale, at any

[13] Victorian Roadmap may see gas use fall to less than half within eight years - The Fifth Estate

location near a pipeline, there are relatively few barriers to entry. As scale grows, over time, this may change.

The proposed changes in essence create new regulated markets, albeit by adapting mechanisms that already exist. The Officials, AEMC, AER and AEMO will not have anticipated all situations that may arise. There is a big risk that the current proposals lock in a system that is not fit for purpose, that is failing to efficiently meet the long-term needs of consumers in the context of a rapid energy transition.

- Officials will face behaviour by market participants that seeks to take advantage of the new regulatory regime in ways that are unintended or not anticipated, and are not in the long-term interests of consumers. This is the problem of moral hazard.
- It is possible that some businesses will gain a first mover advantage and build scale by offering NGEs into the gas market that are not in the long-term interests of consumers – for example, hydrogen produced with fossil fuels.

There are many cautionary examples where, despite the best intentions of regulators, the regulatory regimes put in place have proven unfit for purpose: for example water allocation regimes; aged care; banking; franchises.

The one unfortunate certainty is that the proposed regime will extend the life of the gas networks well beyond their necessary life, involving large avoidable investments

Seventh, resources to manage the new system must be clarified before proceeding. Managing the injection of hydrogen and other gases into the distribution network will greatly increase the management responsibilities of the Australian Energy Market Operator (AEMO), and possibly the AER. It may be true that relatively little change is required to the current regulatory framework, responsibilities of AEMO will greatly increase. AEMO should be asked to identify the resources required to a) define and implement the detailed changes, and b) operate the system. Under the propoosals, AEMO will have a remit that is greatly expanded from managing the Victorian Transmission System and the Declared Wholesale Gas Market (in Victoria) to include the distribution system.

AEMO is already struggling to manage its responsibilities. As the AEMO Consultation Paper for this review states “The scope of the rule change request is far-reaching …”. It will involve many new players participating in the gas market, with potential injection points across the huge distribution system (30,000km in Victoria).

If AEMO’s resources are increased, whether by government subsidy or industry charges, then these changes will also impose unwarranted and avoidable costs on taxpayers and gas consumers.

In the context of the rapid energy transition, AEMO has huge responsibilities managing the National Electricity Market, and those challenges will only grow. As an economist concerned about efficiency and equity, it is disheartening to see AEMO staff potentially side tracked into managing the inefficient blending of hydrogen with methane in the gas network, and in effect extending the life of the system rather than planning to decommission it.